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NOTES AND COMMENTS.

The month just past has been drier than usual for this season of the year, but the occasional light soaking rains have kept things growing. The earlier part was cold and bleak, and very severe frosts were experienced in many places, checking the growth of vegetation. With good rains during August there will be every prospect of a bountiful harvest.

The disturbance and unrest in Europe, Asia, and America, combined with higher prices for cereals, &c., and prospects of good seasons for a few years, will probably cause a boom in farming pursuits, and increased values for arable lands. The temptation to "go in" for wheat alone will be great—especially with the use of fertilisers and the hope of much heavier yields—but it is to be hoped that all farmers will profit by the experience of the past fifty years, and devote a deal more attention to conservation of the fertility of the soil and a maintenance of its proper condition. While "wheat is king," there must be a good deal of respect shown to all other sources of income, and to the cultivation of as many alternative crops as possible, because each crop differs from others in the constituents abstracted from the soil, and one crop cleans and prepares the land for the benefit of another variety following it. Live stock must also be kept, and food grown and saved for the animals. Those who "place all their eggs in the one basket" cannot possibly escape a smash up some day, and that day will always come unexpectedly. Peas, rape, clover (in cool, damp localities), kale, cabbage, maize, sorghum, millets, melons, and many other crops can and must be grown where the farmer wishes to remain on the land.

During the first six months of the present year over 8,300 tons of commercial fertilisers were imported into the colony, while the local production during the same time amounted to 2,500 tons of guano, and 3,500 tons other manures—principally bonedust and superphosphate—a total of 14,300 tons, against about 5,200 tons for the first half of last year. As showing the rapid increase in the use of these fertilisers in South Australia, it may be stated that for the whole of 1896 the value for Customs purposes of the imports of manures was only £2,700, against a value for first six months only of 1897 and 1898 of £7,800

and £23,500 respectively. As stated in last month's issue, the outlay of the farmers and others for manures during the first six months of the present year must read £70,000, and our readers will be glad to know that an amended Fertilisers Bill has been introduced, with a view to prevent the sale of adulterated fertilisers.

According to the official returns the 1898 vintage yielded only 1,263,998galls., as against 1,898,105galls. last year; fully one-third less, owing to the drought. The stock in hand at the end of the vintage was 3,717,008galls., a decrease of 654,943galls. compared with the stock at end of previous vintage.

The following figures will show in a very marked manner the disastrous effect on our producing industries of the late drought. The exports of wheat for first six months was as follows in each of the years given:—1894, 4,530,082bush.; 1895, 2,560,000bush.; 1897, 3,752bush.; 1898, 20,690bush. Flour exports in the same period were 27,451 tons, 28,386 tons, 9,589 tons, 13,053 tons respectively. A considerable portion of the export in the two latter years was only made possible by the large importations of wheat for local use. In the 1895 export season we sent 350 tons of butter to England, in 1896 only 70 tons, and in 1897 nothing at all. The imports, on the other hand, show an enormous rise—1895, 3½ tons: 1896, nearly 130 tons; 1897, 297 tons, valued respectively at £60, £2,414, and £5,543. Export of fresh fruit to England—1897, 11,500 cases; 1898, less than 4,000 cases.

Mr. W. Froggatt, Entomologist to the New South Wales Department of Agriculture, writes in reference to the fruit fly, that the western species (*Haltophora capitata*) is more likely to be introduced into this colony than the Queensland one, as the former has been found in Victoria, and is very plentiful round Sydney, and is more destructive than the latter, feeding upon pip fruit, stone fruit, and oranges.

In Victoria the Department of Agriculture is actively enforcing the provisions of the Vegetation Diseases Act, and prosecutions have been successful against nurserymen who have refused or neglected to disinfect their trees and plants. An orchardist at Wangaratta neglected to destroy the dreadful San José scale on his trees, was prosecuted, convicted, and if he still neglects the inspectors will enter the property with assistants, do the necessary work, and recover the costs from the owner. The officers of the department inspect all fruit, plants, &c., entering the colony, and have entered a crusade against the numerous pests existing in the orchards and nurseries throughout Victoria.

Prickly pear in Queensland is a terrible nuisance in some parts, but a most effective remedy is said to have been discovered in the application of a very small quantity of pulverised arsenic and common soda in small slits made in the leaves of the plant. A similar remedy has been adopted in some parts of Cape Colony, where the plants are slashed to make wounds, and then they are syringed or sprayed with arsenic dissolved with soda, or with ordinary Cooper's sheep dip, or scrub exterminator.

Rape is a very profitable plant to grow where the land is suitable, and where there are animals to eat it down. It is a splendid thing to grow on "wheat-sick" soils, does excellently on reclaimed swamp lands where the water was not salt, also upon strong loam or clay well supplied with humus. The land should be thoroughly tilled, and will benefit if enriched with a good deal of old farmyard manure. If old wheat lands are sown with rape a dressing with 600lbs. of fertilisers containing 8 per cent. soluble phosphoric acid, 9 per cent. potash, and 4 per cent. nitrogen will act very beneficially on the crop. Three pounds of rape seed and 1lb. white mustard seed will suffice for an acre, and will make an excellent mixture. Sow by drill, if possible, early in spring, say middle of August, or early in autumn, say middle of May. It is always desirable to divide off the fields when grazing them, and to shift the flocks or herds frequently, so that the fodder may be conserved and needless waste avoided.

All kinds of sorghums grow well upon loose, light, and slightly alkaline soils. The amber-cane and orange varieties are best liked by live stock. They will bear cutting twice or three times during growth. The last crop should be cut when seed is ripe. The stover or straw is then in its best condition. Twenty to forty bushels of seed per acre is a fair crop. Sow in drills 30in. by 10in., and cultivate often during growth.

Here is an idea for some of the Branches of the Agricultural Bureau to work out. Each member's duty, amongst other things, is to induce some friends to attend the next meeting. His dearest friends should be found within the walls of his own home, or at any rate within the limits of his own family. Do not let those friends remain in ignorance of matters which will tend to make them better informed, more able to contend with the difficulties of rural life, and more useful as members of the general community. Bring them to the front at the meetings, give them a good place there, and if they can contribute items of information, encourage them to do so. By attending such meetings, the sons and daughters of the members, or the other visitors, will pick up many useful ideas, and will become familiar with public life and better acquainted with the people amongst whom they will have to live and do business with in the future. Give the young people a chance to get along in the race which we all have to run.

AGRICULTURAL BUREAU CONGRESS.

The Tenth Annual Congress of the Agricultural Bureau will be held in the Deputation Room of the Public Works Department, Adelaide, on Wednesday, Thursday, and Friday, September 7, 8, and 9. The Minister of Agriculture will open the proceedings on Wednesday morning, and amongst the principal subjects for consideration are the following:—Agricultural Shows (Professor Lowrie); Pruning of Fruit Trees; Manures: Uses, Value, &c.; Conservation of Fodder; Standard Weight for Bag of Chaff; Controlling Fruit Pests and Experience with Codlin Moth.

The meetings are open to all interested in agricultural matters and promise to be very instructive.

FORESTRY.

NOTES ON PLANTING.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

Selection of Site and Distance.

The question what is the best position or "site" on which any tree should be planted is, from some aspects, quite as important as that of proper cultivation. The marked likes and dislikes of some trees for certain conditions have already been touched upon in some of my previous remarks, and it is in planting that these details must be particularly borne in mind.

In England, on most farms, it is generally the custom to use spots where the land is too damp and swampy for ordinary farm cultivation for growing trees that flourish in that kind of "site." The extent of such land may be very limited, perhaps only an acre or two, or even less, but it proves sufficient to grow a good deal of most useful "copsewood," as it is called, such as the common hazel nut (*Corylus avellana*), and several kinds of willows and poplars, prominent among which the common goat willow (*Salix caprea*), one of upright growth, and the upright poplar (*Populus fastigiata*) frequently occur; the hazel nut and willow furnishing when cut over or "coppiced" periodically quantities of very useful wood of a nature admirably suited for making many articles most serviceable to farmers, such as wattle hurdles and gate hurdles for folding or penning sheep, crates for feeding hay to them, spars for thatching, and quite a host of other simple but handy and indispensable articles. Of course in the drier parts of this colony these moist swampy patches do not occur very often; but in other parts, there are many places with a cooler climate where there are either marshy spots or streams that run for the greater part of the year, on the banks of which willows, poplars, ash, oak, and other trees loving moisture can be planted in limited numbers. If this were done, quite a large supply of these timbers would ultimately be available; for, though but a few could be grown on each holding, the total number of trees grown by a large number of farmers and other landholders would be very considerable; just as in Great Britain the quantity of timber obtained from large trees grown in the hedgerows or boundaries of the different paddocks, and along the roads, forms a very considerable item in the supply of home-grown timber. The only way in which most of the more valuable of the exotic timbers from temperate climes will be produced to any extent in this colony is by taking advantage of the moist spots already referred to, as it is practically useless to attempt growing them away from their favorite haunts. This is proved beyond all dispute by the results attained in the Wirrabara Forest in the growth of the American ash (*Fraxinus Americana*). This tree has been planted all along a creek for about a mile on each side of it; this creek in most ordinary seasons contains running water the greater part of the year, and wherever the influence of the water can be felt the trees have grown admirably, and the timber obtained from specimens felled from among them has, on being submitted to various practical experts in the buggy building and furniture industries, been declared unsurpassed in quality by any imported material. But often a specimen of the same tree planted at the same time only 10ft. away may be seen little better than a whipstick in size, while its comrade stands 40ft. high and between 2ft. and 3ft. in circumference at base. The tree is growing in its proper "site." The "whipstick" stands on the dry hillside. It is just the same with oaks, willows, poplars, elms, sycamores, maples; *they must have suitable moisture if they are to do any good*, therefore, to plant them in dry places is to throw time and labor away.

The requirements of pines of various kinds are generally the opposite of the trees last alluded to; but while they like a well-drained soil, free from stagnant moisture in excess, they *also equally require*, in most instances, *a cool climate and a greater or lesser elevation* to thrive to the best advantage. From the positions in which some pines may be found growing or trying to grow, it would appear as if some planters had the idea that to plant a tree in a wet spot that it *never grows on in a temperate climate* would make up for the extra heat that it has to endure in a very dry climate, in a position considerably below its ordinary average elevation. *This is a radical error.* A careful study of the records of tree growth in varying latitudes will suffice to show that a pine which grows at a given elevation in a temperate climate must be placed at a *higher* elevation in a hotter climate to stand an equal chance for fair development, while in a colder climate it will descend to a *lower* elevation to find the necessary position suited to the altered conditions surrounding it.

These remarks apply to the pines of more temperate latitudes, from northern Europe and North America, not to those of southern Europe and around the Mediterranean, such as the Aleppo pine (*Pinus halepensis*) and the Stone pine (*P. pinca*), which are better suited in some respects and for some purposes to the conditions generally existing here than others, coming as they do from parts possessing climatic conditions very much like our own. These pines have not failed this year in spite of the drought, whereas the Remarkable pine (*P. insignis*) has succumbed in large numbers on the plains and on other unsuitable sites, though on good sites at higher elevations *it has stood quite as well as the others.* Those who have rightly understood the requirements of this last pine have always advocated considerable caution in planting it on the plains, as even under very favorable circumstances it cannot be depended upon in such a position to survive too prolonged a period of heat and dry weather, such as the last year or two have witnessed. The Aleppo and Stone pines show great tenacity of life, even under dry and unfavorable conditions; but of course they cannot be expected to grow to their proper proportions on too dry and sterile a soil, and when planted on ground of that character they will remain stunted in size, appearing more like a bush than a tree. Nevertheless, in that form, and when perhaps only 10ft. or 12ft. high, they may prove of some advantage as a breakwind round a homestead, and also give a moderate amount of shelter to farm stock, while, in localities where timber is very scarce, even a dwarf tree is far better than none. It must always be remembered, however, that to produce fine trees of these kinds, they, as well as others, must have their own special conditions - a nice sandy loam, containing sufficient moisture to prevent any check in the upward growth, while possessing ample drainage to prevent a cold, sodden state of the subsoil.

When considering the requirements of the various gums, we find that though they too have their fancy positions and soils, yet, being natives of the country, they can, for the most part, adapt themselves with less difficulty to a limited amount of variation in soil and climate than the various trees that have been introduced from other lands; though, in this as in other instances, the general principle holds good that to produce a tree true in all respects to its standard type, each gum must be grown on its favorite site. But, in many cases where it is not of so much moment that trees should be grown so true to standard either in size or general character, less care will be required in selecting the site. When fine timber is the ultimate aim, however, this point must receive every attention, or disappointment will assuredly follow.

In the drier parts of this colony the redgum must be planted in moist places by springs, waterholes, along creeks, and any other damp spot if it is to do any good. The timber may not always be of best quality for some purposes when grown in such sites, but the trees will generally give good shelter and shade. Anyone at all familiar with the interior of this colony cannot fail to have

observed how invariably the redgum clings to the creeks, seldom occurring very far away from them. And it may be mentioned that, as an instance of this tree's aversion to light porous soils, it is not to be found on the whole of Yorke's Peninsula, from Kadina downwards, growing naturally except in one spot near Minlaton around a permanent waterhole.

The mannagum (*E. viminalis*), the stringybarks (*E. obliqua* and *E. capitellata*), and the swampgum (*E. gunnii*) will not grow in the northern districts as a general rule—they have been tried and proved a decided failure—the surroundings of soil and climate being at variance with their normal habitat in the southern parts of the colony.

The sugargum (*E. corynocalyx*) and the South Australian bluegum (*E. leucoxydon*) can be planted with more or less successful results over a considerable variety of soils, growing in all forms and sizes, from the stunted and shrubby, in poor and exposed sites, to the grand timber tree over 120ft. high in the sheltered mountain glen, or on the deep, moist soil of the rich plain; and the site must be selected by the planter for these trees according to the purpose in view when planting. A word must be said here in connection with the susceptibility of the sugargum to frost, as this has rather an important bearing on the choice of a position for this tree, either in greater or lesser numbers. It is a well known fact that frost generally strikes with greater severity on the lowest levels; if, therefore, it is desired to plant a low-lying piece of ground with sugargums, it will be necessary to delay the planting till all the risk of any frost whatever has passed away, and the cold ground has become somewhat warmer. If a spot be selected, however, on a higher level, situated on a good rising ground, where the natural rise and fall of the surface secures good drainage and a corresponding warmth in the soil, these gums may be planted rather earlier, because the frost never rests so injuriously on the higher elevation. The omission to suit the time to the site in planting sugars has frequently led to disastrous results, and the necessity for care in making the planting work fit in with the local conditions of any site selected is very evident, on mature reflection.

The amount of shelter that is available around a planting site is a great factor also in the ultimate success, as well as in the immediate growth, of any young trees. An exposed position, where the wind is vehement from any given direction, will always produce a one-sided growth in trees, as they will be compelled by the force of the wind to develop their most vigorous branches away from it; and hence trees grown on high land, overlooking the sea, may invariably be found with most of their branches on the side toward the land. I have frequently seen this tendency so pronounced in plantations growing by the seaside in the south of England that it was easy to rest on the almost flat tops of the trees—such as the beech (*Fagus sylvatica*), the oak (*Quercus robur*), and others—after climbing up their short trunks. On any hill the exposure will generally have to be reckoned with, and therefore it will be well to bear in mind that the trees should be planted closer—with a view to giving each other greater protection—than they will require to be planted in better sheltered places. Speaking in general terms, 6ft. by 6ft. is a suitable distance to plant in such positions, but in matters of this kind very much must be left to the individual judgment regarding the prevailing local conditions and other circumstances in each particular case. In a well sheltered position, the young trees will not have to battle with the vehemence of the winds, and there they can be planted much farther apart, if they are designed to afford protection or shade, and not intended for the production of good straight timber. Here it may be remarked that the distance for planting for timber only, and the distance required for ornamental and shelter purposes, are *two very different things*, which must not be confounded one with the other, though

they very often are ; and it is to guard against errors in this direction that I briefly refer to this matter ere closing my remarks on selection of site.

On a poor dry site the trees might be planted closely, as well as on an exposed site, as they are not likely to attain a large size ; but on a well-sheltered and favorable position, where the soil is rich and retentive, it is a great mistake to plant too closely together when shelter and appearance are to be secured, because a tree or group of trees for this purpose should possess as wide and dense a head as possible, and a short trunk.

The very opposite of this is produced by planting closely. The near proximity of each tree to its neighbor leads each to race the other for the light, and causes the trunks to be drawn up rapidly to their normal height, and at the same time makes them lose their side limbs, which, being unable to get the light and space their leaves require, die off far quicker than they do when planted wider apart.

Therefore, to plant trees in a paddock, with a view to getting shade for the stock from the sun and shelter from the wind, or on a recreation ground, street, or road, in order to increase the ornamental appearance of the locality, and to plant them only 6ft. apart is to waste good trees, valuable time, and money, and to produce the wrong shape of tree into the bargain.

In judging the proper distance, the planter must be guided to a certain extent by the general habit of growth of the trees he intends planting, as some, being of a wider shape, require relatively more space than others which are more restricted and pyramidal in form, in order to develop their limbs to the greatest extent according to their natural tendencies.

Having regard, therefore, to the individual requirements of various trees, as well as to the conditions of the position in which they are to be planted, it may be stated broadly that from 15ft. in shallow, poor soils, with trees of rather confined habit, to 30ft. in stronger and deeper soils, with trees of broader growth, should generally be the distance allowed ; and it cannot be too often insisted on that it is far better to give more time and labor in attending properly to a few trees *after* they are planted, and thus secure a higher percentage of success, than to plant too many trees and neglect them afterwards, as is but too often the case. Briefly, then, to summarise the points alluded to, not only must there be proper cultivation, but wise selection of a suitable site for each kind of tree, a proper time to plant it, and a suitable distance allowed for its future development, if the hopes of the planter are to be successfully attained.

THE BEEHIVE.

NOTES AND HINTS FOR AUGUST.

BY APIS LIGUSTICA.

The beekeepers' season may be said to begin this month, and from now until after swarming there will be plenty of work to do in connection with the apiary. As the orchard trees come into blossom and the weather gets warmer the stocks will steadily increase in weight. This year there were many fine days whilst almond trees were in bloom, and this enabled bees to gather a nice quantity of honey from this source. All grass and weeds around the hives should be kept cut short, and later on the ground should be cleaned with the spade. A very good plan is to destroy the grass with a solution of scrub exterminator, as this enables the ground to be kept clean without jarring the hives, as is the case when a spade or hoe is used.

The greatest caution should be exercised in spreading the brood, as it is termed ; that is, by inserting empty combs in the centre of the brood nest to

cause the bees to produce brood faster than they otherwise would do. If a colony is large enough to completely fill the hive, and it is noticed that there is brood in only two or three combs, one of the outside combs should be lifted out, the capping of the honey sliced off on both sides, and this comb may be inserted in the middle of the brood combs, which should be moved to one side to make room for it. The bees will at once begin to remove the honey from the centre cells and raise brood in its place. By doing this at intervals of about two or three weeks a great impetus will be given to the brood-rearing, and the result will be a very large colony. This spreading the brood should never be attempted unless there is plenty of honey in the hive. The practised eye will determine at once whether a colony be benefited by this operation, but the novice should carefully consider whether there are sufficient bees in the hive to cover and keep warm the young brood after the extra comb has been inserted.

This is the very best time to transfer bees from boxes to movable comb hives. No matter how carelessly the operation is performed, it is almost certain to be successful at this season, provided that the queen is not injured or lost. The following method of transferring is taken from Quinby's "New Beekeeping," and is well worth practising:—Have the following articles in readiness—A transferring board about the size of the frames, with cleats 2in. square under each end; grooves $\frac{1}{2}$ in. wide and $\frac{1}{2}$ in. deep should be made at intervals of about 2in. across the board. Transferring sticks for holding the combs in place should be $\frac{1}{2}$ in. square and $\frac{3}{4}$ in. longer than the depth of the frame. Fasten two sticks together at one end with a piece of fine annealed wire, long enough to bring them 1in. apart. Attach a piece of wire to the other end of one of these sticks, leaving one end of the wire loose. In this way the sticks are in pairs, ready for use. A smoker, a long sharp thin-bladed knife, a chisel, a hatchet, a small common handsaw, a small wing, and a dish of water will complete the outfit. After smoking the bees slightly turn the hive bottom up and place an empty box over it the same size as the hive. By tapping the hive most of the bees will leave it and enter the box above. When most of the bees are in the box place it upon the old stand, raising it a little in front for the passage of the bees, and remove the hive containing the combs. Place the hive bottom up on a solid support about 2ft. high. Saw the combs and cross sticks loose from the side or sides you desire to remove. If the combs stand parallel with the sides it will often only be necessary to remove one side, but if they are diagonal two sides will need to be taken off. If the grain of the wood runs up and down split the sides in several places and take out the pieces separately, and if the grain runs across pry them off with a chisel. During all operations use care not to crush any bees remaining in the hive. Upon a table or bench near by place the transferring board. Now, with the knife, remove the outside combs, brush off the bees with a wing, and set them on one side until you come to one containing brood. Place this upon the board described so that it will occupy the same position as it did in the hive, or if, as is sometimes the case, it will cut to better advantage by turning it half way round, bringing the top to the end of the frame, this is allowable. Place the frame over the comb in such a manner as to bring the brood as near the top and centre of the frame as possible, as this is the warmest position in the hive. Cut the comb to fit snugly in this position. If the comb is not large enough to fill the frame use the combs first removed to fill up with. Push the free end of the transferring sticks through the grooves where the combs need support, and fasten to the other end by winding the end of the wire tightly around it, which will hold the comb firmly in place. Use a sufficient number of sticks to secure it firmly, but do not let them cross the brood more than is absolutely necessary. Place the frame in the hive it is to occupy, and proceed with the next brood combs in the same

manner. If there are combs without brood sufficient to fill one or more frames place them at the outside with the brood combs in the centre. A dish should be at hand to receive such portions of comb honey as are not put in the frames. Brush all bees into the hive with a damp wing, and take it to the old position on the stand. Empty the bees from the box in front of the hive, and see that all enter. Contract the entrance and in all ways prevent robbing. If they are strong the bees will soon join all the parts and fasten all the combs securely to the frames, when the sticks may be taken off and laid away for future use. For the first experiments in transferring beginners should select a hive with old, tough, and straight combs. It is desirable to find the queen, if possible, when driving the bees into the box, and cage her. After the transferring is completed place the cage on top of or between the combs, when the bees will more readily gather among them. When they become quiet she may be liberated.

POULTRY NOTES.

Written for the "Journal of Agriculture and Industry."

BY D. F. LAURIE.

While recently on a visit to Melbourne and Sydney I made a point of collecting information about the poultry industry. As regards certain utility breeds, those colonies are ahead of this, both in quantity and quality; but in time we shall be in as good a position. In Victoria Indian Game had been well known some years before they appeared here, so also were Langshans, Orpingtons, and Wyandottes. Again, in South Australia someone might import a few specimens of a breed, but no effort was made to popularise them, whilst in both Victoria and New South Wales in most cases several importations would be made, and in consequence of the vigorous state of "the fancy" the competition for honors at poultry shows led to the continued breeding and importation of the best obtainable specimens. Again, I found in both colonies that first-class specimens of many of the utility breeds had for many years been in the hands of numerous farmers and others. Of course they will have to continue improving for many years before a constant supply of high-class birds is available for export. Mr. G. Bradshaw, the Sydney Government expert, considers that at least five years must elapse. Victoria has exported considerable quantities of first-class poultry to England, and I was further given to understand that the returns were satisfactory. Last year was disastrous to poultry in both colonies, but with the present prospects of an excellent season it is hoped that the export trade will grow. I was also informed by numerous journalists and others that very great interest is being displayed by the farming community, and that large numbers of pure-bred birds are changing hands. Those in a position to express an opinion are confident that poultry growing and egg production for the export trade will in time become a prominent industry. The stupid prejudice against pure-bred poultry is rapidly disappearing. Nearly every newspaper devotes some space to poultry advice from the pens of experts, and a better knowledge of the subject is being gained. Victoria supplies the greater portion of the poultry imported into West Australia, in spite of our geographical position. The fact is, our eastern neighbors do not lack enterprise. For a long time they have been freezing and forwarding regular supplies to the West, while, so far, our shipments have been of live birds only. I was informed that considerable quantities were being shipped from Portland to South Africa, and noticed advertisements from certain business firms offering fair prices for suitable birds delivered at the works. The South African market has

for some considerable time offered an excellent outlet for poultry and meat, but it is only quite recently that this colony has made a move. I was unable to obtain statistics of the Victorian export trade, but it is very considerable. Eggs have repeatedly been shipped to England with satisfactory results. They are packed in cardboard squares filled with pea husks. In Sydney I visited the large poultry show held under the auspices of the New South Wales Poultry, etc., Society, and assisted in the judging. I was much struck with the popularity of both Orpingtons and Wyandottes, two breeds but little known here, yet valuable all-round fowls. The same state of affairs exists in New South Wales as in other parts of Australia. The days of the fancy varieties seem numbered; where once imposing classes of Cochins, Brahmas, and Spanish were to be seen, the competition is now very limited. In Minorcas, Leghorns, Langshans, Dorkings, Indian Game, Orpington, Wyandottes, and ducks the classes were large; Leghorns and Minorcas could make a decent poultry show by themselves. They have a breed in New South Wales called "Colonial" or "Sydney Game." These breed true to color, and are evidently the result of a cross between the Malay and English Game; they are large—one cockbird weighing over 14lbs.—and while many advocate them for crossing with various breeds in preference to Indian Games, others, including Mr. Bradshaw, hold an opposite opinion, and state that the flesh is coarse though abundant. Victorian poultry societies have refused to recognise the breed. Malays are not plentiful in New South Wales, and I think we could show them something to surprise them. Quite the feature of the show was the display of frozen poultry, &c., by the New South Wales Board of Experts, and in charge of Mr. G. Bradshaw, who gave visitors much valuable practical information. The display formed an object lesson of the greatest value in educating people as to the merits of different breeds. It would pay well to make a big display on similar lines in South Australia. The value of the Sydney exhibit lay in the fact that various pure breeds and crossbreeds were exhibited in contrast to mongrels and unsuitable breeds. To each a large label was attached describing the breed and its merits. On a very shapely plump bird with white skin and flesh was a label with "Orpington pullet, a very profitable breed"; "Old English Game-Dorking, 5½ months old, 4½lbs. weight, cost 1s. 1d. to rear"; "Colonial Game, good breast, large, but rather coarse"; "Indian Game-Orpington, one of the best crosses for table and export, good meat and plenty of it, 6 months old, 5½lbs. weight"; "Old English Game-Plymouth Rock, an excellent cross for excellent meat"; "Plymouth Rock, good constitution, moderate layers, rather slow for developing for market, suit a family best"; "Buff Orpington, white legs and flesh, scarce as yet"; "Andalusian, good layers, difficult to breed to color, table qualities of little account"; "Brown Leghorn, great layers, their introduction into farmyards has reduced the size of farm birds"; "The too common duck; this specimen fairly represents the total of farmers' stocks, wholly unprofitable"; "Langshan, good all-round fowl, chickens somewhat slow to develop, hardly so popular as a few years ago"; "An old-time Brahma, once the farmer's fowl, full breast, good meat, fair layers, now scarce"; "The common hen; in spite of importations of pure stock the unprofitable barn-door still rules the roost"; "A five-year old hen, long outlived her sphere of usefulness"; "Royal Blue, a new Australian production meat capabilities apparently good, reported abundant layers." In addition, there were boned fowls, cases of splendid chickens and ducklings all packed as for export; in addition, there were crates of rabbits and hares; the whole forming a very attractive exhibit and constantly surrounded by large crowds.

In response to an invitation from Mr. Stevenson, the secretary to the Board of Experts, I visited the Government freezing works, and was well pleased with what I saw. First we inspected the poultry department, and witnessed the

killing and dressing of poultry for export. The method adopted is as follows:—The killer is seated by a large box to receive feathers; he takes a fowl from the pens behind him, grasps it by the wings and feet in one hand, and breaks its neck with one jerk; the neck and head are then held against the side of the feather box, and in a remarkably short time the bird is denuded of feathers and passed on to the dresser. When in full swing it requires only three minutes from the time the bird is taken out of the pen till it is trussed ready for freezing. In one case the time occupied was only 2min. 48sec. The greater portion of the poultry is for the South African market, where the demand for very high-class poultry is not so rigid as in England. Since November last the board has exported thirty-five thousand (35,000) head of poultry, one effect being that values have risen 25 to 30 per cent. in Sydney. I was surprised at the great size and splendid condition of the hares, of which there were then upwards of thirty-two thousand (32,000) in the cold chambers. Hares are received at the rate of about 10,000 per week; the best come from the very cold portions of the colony, and are very red in color and in wonderful condition. There were a few thousand rabbits in addition. I entered three of the cool chambers, in two the thermometer stood at 8° F., in the other at 10° F. Both Messrs. Stevenson and Bradshaw were much pleased when I told the history of the Port Adelaide Produce Depôt, and of the splendid additions now being built by the Engineer-in-Chief for the Government.

In Victoria, Dr. Brown, of the Victorian Department of Agriculture, has been examining diseased specimens of poultry, and has also given attention to the insect pests which cause so much loss to poultry owners. He has reported on the subject, and I understand regulations have been framed which may affect South Australia. This colony is infested in many places with a pest known as the poultry tick or bug. The late Mr. Frazer S. Crawford identified this as *Argas reflexus*; Dr. Brown, however, names it *Argas Americanus*, the Texan poultry tick. As it is not known to exist in Victoria, measures will be taken to exclude our birds, or at any rate submit them to rigorous inspection, and perhaps quarantine.

I am anxious to procure varieties of tick, not only from fowls and fowlhouses, but also from the trees which harbor ticks supposed to attack fowls. They should be forwarded in small bottles, each sort separately, and accompanied with particulars of where found. All such specimens will be forwarded to Dr. Brown, who will examine, identify, and report upon them.

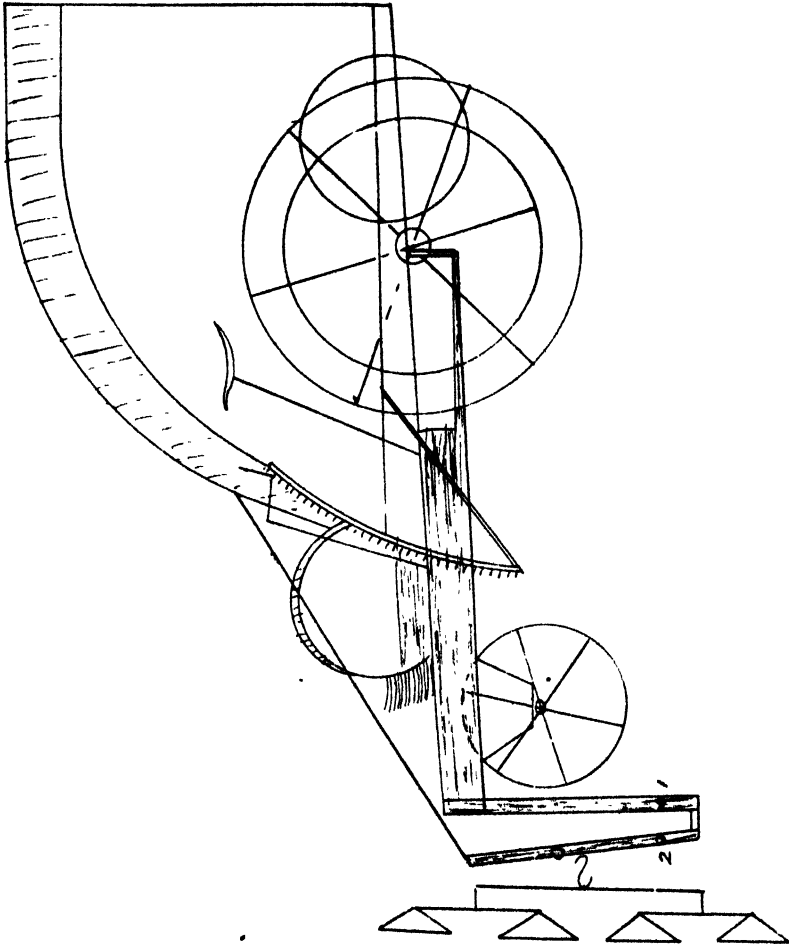
As regards preventive measures, firstly carefully examine any new purchases, look under the wings, and, if any blue-black spots under the skin appear, the bird is affected, and should be quarantined and immediately treated. Apply equal parts of kerosene and oil, or immerse the bird all but its head in Cooper's sheep dip, or Whalley's disinfectant. Construct all poultry houses of iron, avoid woodwork and paling fences. All perches should be carefully planed and free from cracks. Be ever on the watch; examine all cracks and crevices, and apply a strong solution of either of the above dips. Frame the perches and set the legs of the framework in tins of water containing a little kerosene or Whalley. Keep the soil loose; the fowls greedily devour these ticks. By such means may the pest be dealt with and finally exterminated.

WHITE PAINT.—A cheap and good paint for wood, iron, or brickwork, can be made in the following way:—One gallon skim milk, 1lb. freshly slacked lime, $\frac{1}{2}$ lb. whiting, 1 pint linseed oil (or 1lb. mutton tallow with $\frac{1}{2}$ pint turpentine.) Mix the slacked lime with half the milk thoroughly, then stir in the pulverised whiting; add the other ingredients at once; stir well. Let stand till next day; stir up thoroughly again, and apply with a large brush.

SOME HELPS FOR THE FARMER.

Improvement on Draught of Strippers.

Mr. J. J. Gebert, Kingswood, a member of Richman's Creek Branch of the Agricultural Bureau, submits an improvement upon the draught of stripping machines which he has used for fourteen years, on rough country, with three, four, or five horses :

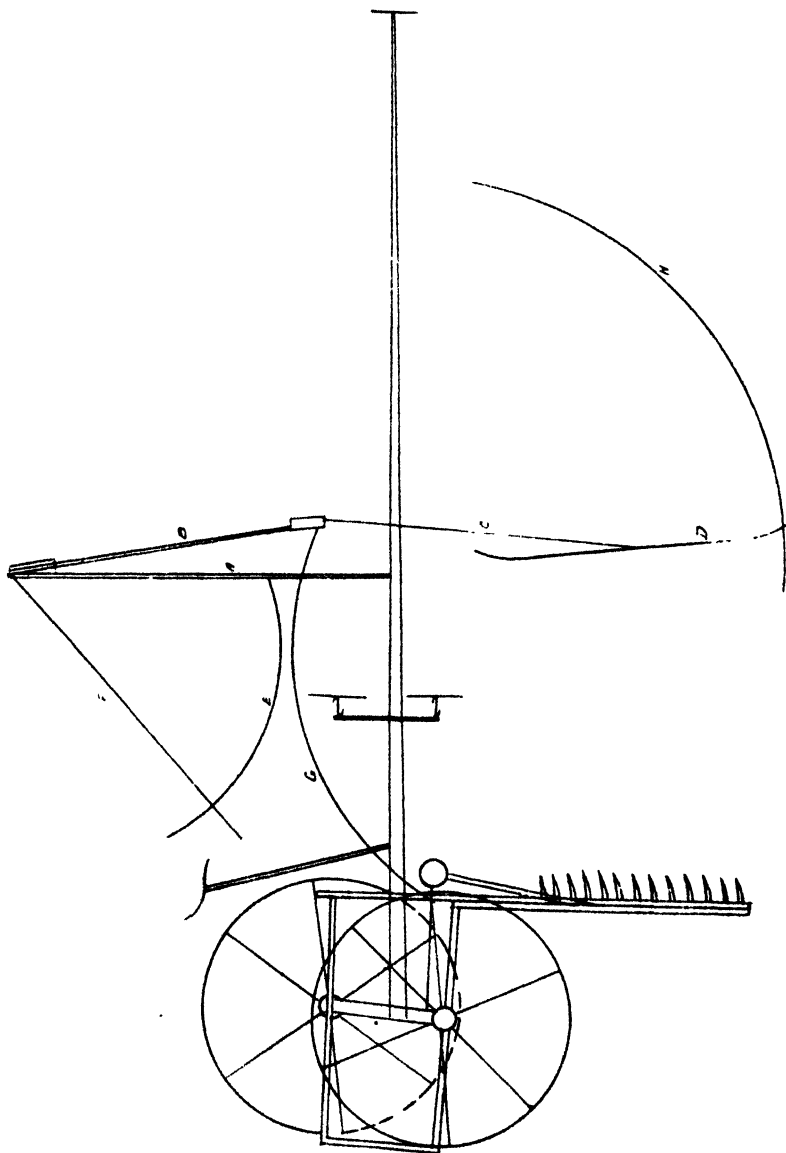


The bar marked 1 is about 2ft. 6in. long, clear of the platform, $2\frac{1}{2}$ in. x 1in.; the bar marked 2 is 4in. longer than 1. The chain from No. 2 bar to off-side of machine should be fixed not higher than 5in. above the drum over the beaters, and the bar itself should slant on the off end 4in. more forward than the near end. The S-hook from four-horse swing should be fixed some 3in. nearer the off-side. The holes marked on No. 1 and No. 2 bars are used for three horses. If draught is fixed as described it is a great deal lighter and easier for the horses, as there is no dragging to the off-side. Four horses abreast can walk straight, and reap with a full comb.

Improvements on Mowing Machines.

Mr. J. J. Gebert, Kingswood, also sends two plans with descriptions of improvements in mowing machines.

The first shows Mr. Gebert's suggestion for improvement on mowers with knife in front, which he is now trying.

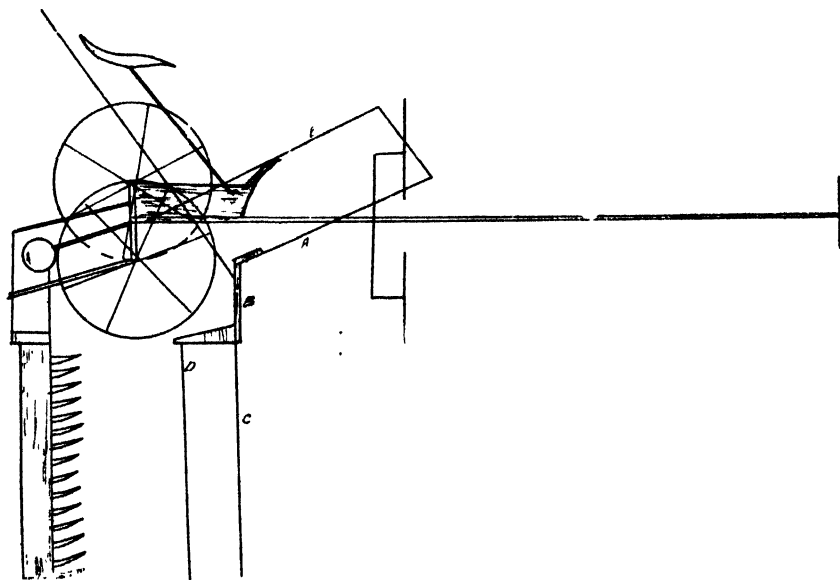


Bar A should stand upright from the pole fairly strong, and high enough to carry B over the horse's rump: B, $1\frac{1}{2}$ in. piping iron, long enough to reach to

the middle of where the knife is to cut ; c, lin. piping, to reach within 9in. of the ground ; d, light bar, full length of knife, with both ends bent slightly forwards and downwards ; e, half-circle to keep lever, f, where it is wanted. A box is to be placed on top of bar a for b to go through ; lever f is fixed on b to work d backward or forward, according to height of crop ; a goes to the outer or off end of b to strengthen it, having a box on the end for b to go through ; circle h is simply a line to show the run of bar d.

The driver will work the bar c and d on the previously-mentioned machine, and d on the latter, backwards and forwards by lever f, according to height of crop. These bars press the crop forward and downward, and as the crop escapes from beneath the bar it will swing back. The driver should keep the bars so far forward as to give the crop full chance to swing back, and then it is caught and cut by the knife. There is simply the one cut, and the hay jumps 18in. to 2ft. behind the knife. There will be none hanging on the knife or comb, and the wind will not interfere with mowing either way.

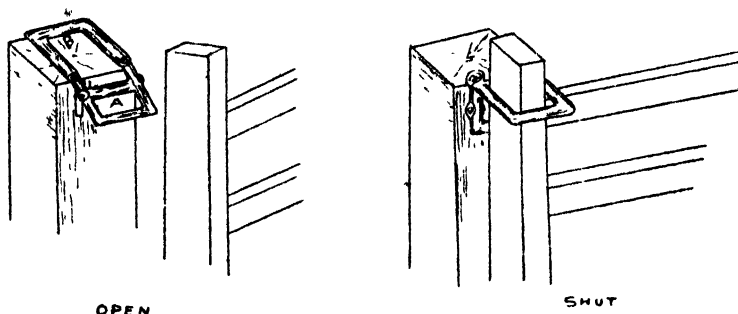
The following is a mower with knife behind, for bringing the crop back on the knife. This has been used for two years with satisfaction :--



Bar marked A is of T-iron, 5ft. long, bolted to pole at the middle of bar ; B, iron 1½in. x 1½in., sufficiently long to clear the wheel, the near end fixed with a slide on bar A ; C is of light pipe iron or wood bolted to B, to go across full width of knife ; D may be put on in very short crops ; bar E with slots for lever to be connected with A on top, lower end to be fixed to machine with small clamp or bolt ; F, lever to be fixed to slide near B, and to be pressed forward for high crops or back for low crops.

A Self-Acting Gate-Loop.

If a gate is properly made it cannot warp or sag, and then, if it is well hung to an immovable post, the following device will save a lot of trouble:—



This is simply a link in two parts hinged together. When fixed to a gate-post the under part of the link (A) causes the upper part (B) to fall over the dropping stile of the gate. By lifting the link the gate can at once be released. The *London Farmer and Stockbreeder* is credited with the above design, but it has been in use for a long time on a few farms throughout the Australasian colonies. On page 136, September, 1897, of this journal is illustrated the only proper way to make a stiff and substantial gate. Gates may differ in pattern, but the principle of construction is the same in every properly-made gate.

BUTTER-MAKING.

By G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

Churns.—The value of a churn depends upon (1) simplicity of construction; (2) its merits as a manufacturer of fat into butter within thirty to forty minutes with the least possible loss from cream properly conditioned and treated; (3) wood being thoroughly seasoned and of hard texture, free from cracks, and with the least absorptive power; (4) dimensions of lid such as to give convenience in thorough cleaning and drying the inside of churn, and to allow a perfect exposure of inside to the influence of light (this is highly important); it should be of light weight.

Butter-workers should be constructed to afford thorough drainage for the moisture expelled from the butter. The roller ought not to be so elevated as to give insufficient pressure with small quantities of butter; eight-fluted rollers are recommended when provided with springs which yield to pressure of quantity and avoid damage to the texture and body of butter. The old-fashioned three-fluted roller is injurious, as efficient working cannot be accomplished without causing greasiness, and if buttermilk is left in by mistake it becomes locked into the body of butter. This damaging influence is much increased with a close compressing roller, and in all cases speedy working will bring about greasiness. In working butter great care is necessary, as a superior butter is very easily damaged in working. A few extra turns upon a worker will convert good-textured, high quality butter into that of almost inferior quality. Testing of texture by means of butter hands is recommended as a safeguard against damage. When a square of made-up butter breaks without an adhering influence, and distinctly shows the grain, the butter has

not been overworked. As small pieces of butter passing through with the water escape on to the floor during working, it would be profitable to provide against this loss.

Washing Churns and Workers.—Immediately after use churns and workers should be washed in slightly warm water, afterwards scrubbed with salt and cold water, and then thoroughly scalded and dried. Before using, scalding and cooling down with cold water to temperature of churning is necessary. Lime water should be used once or twice a week. With this combined treatment these utensils would retain no bad odors, and that greasiness which is often apparent when churning and working would cease to exist. The same treatment applies to all wooden utensils in the dairy.

Churning, and Effects of Churning Temperatures.—In churning cream the revolving speed of churn demands more attention than is usually given. To obtain the highest quantity of butter from any conditioned cream consideration as to speed of churn is absolutely essential. Speed requires regulation according to temperature, ripeness, consistency, and bulk of cream in churn; also temperature of air, feeding and period of lactation of milk cows. Cows fed upon dry fodders and meals, and advanced in lactation, produce milk having an abnormally high percentage of hard fats (stearin and palmitin), thus necessitating a higher temperature of cream and increased speed of churn to provide against loss of fat in buttermilk. Experiment has proved that separated cream, ripened from the milk of cows in an advanced milking stage in winter weather, could not be churned in a satisfactory time without raising the temperature to 65° F. To work at such a temperature in the spring and summer months, with the combined conditions of hot weather, succulent food, and cows in the early stage of milking, would undoubtedly result in heavy fat losses; also losses through inferior butter. We are all familiar with the oily and greasy appearance of butter, observed so frequently in hot weather, when over-heated and over-ripened cream had to be dealt with. This undesirable and unprofitable condition was due to the liquid globules of fat being retained in the butter granules along with an excess of moisture and buttermilk, the latter in so fine a state of division as to become impossible of removal. As would be expected, the keeping quality of this butter is very inferior, rancidity at a very early stage taking place owing to decomposition of the already tainted caseous matter. The texture of such oily butter cannot possibly admit of anything like efficient working. What little working may be done after the butter has assumed a firmer texture can only be accomplished with extreme care, but lapse of time means increased fermentation, and unless the butter is immediately disposed of a very low price can only be expected. When churning extends over forty-five minutes, as would be the case with under-ripened, thin cream, churned at too low a temperature and speed, an excessive amount of fat passes away in the buttermilk, and more so with cream previously kept in cans having a varied degree of acidity. In both cases oiliness will be observed in the butter, and should faster churning take place shortly before the cream breaks the loss of fat in the buttermilk and unaltered liquid fat in the butter will be greater. Long-churned butter generally possesses a firmer texture, and has a higher keeping quality than quickly-churned butter. Butter made from cream churned under twenty minutes means that temperature and speed have not been attended to.

Sleepy or Lazy Cream.—This condition arises generally towards the beginning of winter, when cows are fed upon dry feed, and have been long in milk, bringing about the before-stated change of the butter fats. Sleepy cream is attributed to several other causes, such as unhealthy cows, cream over and under ripened, too high or too low temperatures, excess of cream in churn and too rapid churning causing little concussion, inattention

to churn ventilation, uncleanness and long transmission of milk in badly-ventilated cans, feeding of cattle upon unsuitable food, also washing churns with soapy water, has been known to bring about sleepy cream. A remedy for sleepy cream, when in the churn, is to add a little sour milk or hot water, but the water must not be over 102° F.

Butter Records.—By keeping a record for a short time, similar to illustration below, an educational advantage would be gained in regulating the speed of churning to the most profitable use.

Date.	Temp of Cream in Ripening	Degrees of Acidity.	Number of Gallons.	Temperature of Cream	Revolutions per Minute.	Time of Churning.	Test for Fat in Butter-milk.	Butter Pounds.	Remarks
	60° F.	·7	—	56° F.	45	40 min.	·25 %	—	—

Acidity test will be explained under the heading of "Practical Demonstrations."

Experimental Abstracts showing Fat Tests in Buttermilk from Cream Churned at Varied Degrees of Acidity, Temperature, and Speed.

Temperature of Cream Ripening.	Degree of Acidity.	Temperature of Cream.	Churn.			Buttermilk Fat Test.
			Kind	Revolutions per Minute.	Time.	
					Minutes.	Per cent.
60° F.	·7	56° F.	Box	40	30	·22
62° F.	·85	51° F.	"	45	45	·27
66° F.	·65	58° F.	"	45	30	·20
58° F.	·5	60° F.	"	55	45	·40
64° F.	·7	64° F.	"	6	30	·70
64° F.	·45	61° F.	"	60	45	1·00

Temperature of churning-room is not considered here, although it is necessary to consider temperature of cream with that of room.

The following comparisons are regarded as favorable:—

With room	80° F.,	churn at 52° F.
"	70° to 75° F.,	" 56° F.
"	65° F.,	" 58° F.
"	50° to 56° F.,	" 60° F.

Temperature in churn ought not to increase over 2° F. during working. Circumstances which demand the lowering of speed of churn and temperature of cream—(a) High temperature of butter-room; (b) thick and fast cream; (c) increased bulk in churn; (d) cream from the milk of early-milking cows fed upon succulent food. Opposite conditions will necessitate a higher speed and temperature; b and c can be easily remedied.

Ventilation of Churn—When churning is commenced injurious gases, as carbonic acid (CO₂), are given off by ferments; also nitrogen and oxygen become liberated, and, along with the expanded air, exert an outward pressure in the churn. Odors peculiar to cream also escape. If immediate and continued ventilation is not permitted these objectionable gases will be driven into the body of cream and be retained, and in all probability will find a way into the butter. Ventilation must take place after the first few revolutions, and be continued at short intervals until no escape is felt.

Washing Butter.—To wash butter to perfection one must have the butter grains in a fine and free state as obtained almost immediately following the addition of the breaking water. Careful and thorough washing, promoting the keeping quality of the butter, is one of the great secrets of success. With insufficient washing the terrible neglect will show itself on the butter-workers when the buttermilk is observed running freely from the butter. To properly remove this fermentative, rancid-causing liquid, is beyond the skill of the maker without seriously damaging the texture of the butter. Having run the buttermilk from the fine grains and added sufficient cold water, the churn ought to be revolved a few times before removal of the water. The same should take place with a second washing, and if followed with a ten minutes' treatment with brine very little caseous matter will be retained in the butter. With over-churned grains it is impossible to get rid of buttermilk, either by washing or working. Temperature of washing water must be at least three degrees under the average churning temperature of 57° F., when its firming influence is obtained. Purity of water is very important. We have found water to all appearance perfect, but accountable for a long-continued difficulty in the quality of butter. Water from wells without sufficient surface protection, and where dairy or other sewage matter is allowed to putrefy in the immediately surrounding ground, cannot avoid having in solution the products of decomposition, as ammonia and injurious acids. Finely-divided solid matter will also find a way into the water, and when used for washing butter the soluble impurities are said to enter into combination with the flavoring acids of the butter. Aroma and flavor are no doubt due to the volatile fatty acids, principally butyric and caproic and bacterial products. Overwashing will reduce aroma and natural color; still, the mistake of overwashing at the expense of a slight reduction in flavor is of a trifling monetary loss when compared with butter containing an excess of buttermilk. Large-granuled butter holds the flavor somewhat superior to that of small, but it also holds the buttermilk to such an extent that proper washing is impossible, resulting in a product of very inferior keeping quality.

Salt.—Common salt (Sodium chloride = Na Cl). The purity of salt for butter and cheese preservation is of the highest importance, concerned as it is with the quality of the produce. Salt of a slow-dissolving property, and exhibiting a strong affinity for absorbing moisture from the air, is quite unfit for preserving purposes. Such a salt would show the presence of a substance known as calcium chloride (Ca Cl_2) and other impurities, as gypsum or calcium sulphate (Ca SO_4), and magnesium chloride (Mg Cl_2). Calcium chloride, when present even in small quantities, will cause salt to cake, and bitterness is due to calcium sulphate and magnesium chloride. A good sample of salt will contain 97 per cent. of pure sodium chloride, and will dissolve readily in water, leaving neither milky trace nor insoluble substances. Salt should always be kept in a perfectly dry place.

Salting in Churn—Brining granular butter in the churn exerts a beneficial influence upon its keeping quality and flavor, the butter grains becoming fully exposed to the flavoring effects of the salt; temperature is speedily lowered, thus firming the grains and expelling and liberating what little buttermilk might have escaped the previous washing. The full effect of brining is obtained after washing. Water dissolves 3·2lbs. and upwards of salt to the gallon of water (10lbs.), but solubility varies with purity. The quantity of salt deposited in butter depends upon (a) size of granules, (b) time exposed to brine, (c) final dryness of butter. Brining at the rate of 2lbs. of salt to the gallon will deposit in the granules ·25 of 1 per cent. from the 2lbs. brine in thirty minutes' exposure. Ten minutes' exposure is sufficient. The advantages of partly brining in the churn are as follows:—(1) The butter will be salted

more evenly; (2) keeping quality extended; (3) it will be firmer, and of a better color and flavor; (4) the weight will be greater.

Dry-salting and Working.—Butter salted at the rate of 4 per cent. will contain nearly one-half of that quantity after working. The following is given as an average analysis of the impressed liquid:—

	Per cent.
Water	90.00
Caseous matter	0.15
Milk-sugar and acid	0.60
Mineral, exclusively salt	9.25
	<hr/>
	100.00

Before salting upon the worker the butter should receive a little working, to be increased or decreased according to firmness of texture, amount of water present, and quantity of salt to be used. Quantity of salt, even distribution, and incorporation is of vast importance. In my opinion salt above $3\frac{1}{2}$ per cent. added to moderately moist butter exerts no preserving influence, but is decidedly injurious, and the injury is extended with the increased dryness of the butter, resulting in solidification of salt in the butter and also upon its surface. It must be borne in mind that water can only hold in solution a certain amount of salt; all over that quantity must remain in the solid state. Unevenly distributed, improperly worked salt will cause butter to present a mottled appearance, due to the grains attracting the surrounding moisture. This takes place more readily when coarse, inferior salt is used, and even bitterness in butter is traceable to this mistake. Streakiness is a common fault, brought about by careless manipulation and working in of the salt. Caseous matter left in butter through bad washing will present a streaked or blotched appearance, but must not be confounded with streakiness caused by bad salting. Butter ought to be rolled out and the salt cautiously sifted over, followed by careful working. In the autumn and winter months the solid fats of milk are in excess, and with a low-temperature butter-making room and too heavy salting and working dry, crumbling butter will be the result. Leaving butter over-night to be worked in the morning at this season of the year is unadvisable, as damage to the texture and quality is difficult to avoid, owing to hardness of butter.

Coloring.—Superior coloring must always be used, as cases of damaged butter have been traced to the use of cheap, inferior coloring matter. The coloring used in Denmark, Sweden, and England are solutions of the fruit flesh of the annatto tree dissolved in hemp or sesame oil, and with varying quantities of turmeric added. With highly-colored butter the body and texture are affected, and exposed to the danger of rancidity. Preparations of coloring in oil are to be recommended as economical, as they mingle with the fat and do not become lost in the buttermilk. Quantity of coloring to be used depends upon strength, richness of cream, and demands of the market. For butter exported to England little coloring is wanted, as the English people look with suspicion upon highly-colored butter. In Denmark the amount of coloring is added in order to produce that pale primrose tint so highly desired by British consumers, and to a great extent this is why the Danish butter has such a firm hold of the home markets.

Natural Color of Butter depends upon the following:—(a) Breed and individuality of cow; (b) feeding—spring butter is highest in color; (c) ripening of cream; (d) temperature at which cream is churned—high temperature reduces color; (e) temperature of washing water, and number of times washed in churn; (f) duration of churning; (g) pure salt heightens color; (h) exposure to pure air with daylight heightens color; (i) pattern improves color.

Faults and Defects in Butter.

Faults in Appearance—

		Causar.
Fatty and oily .. .. .	..	Too sweet cream, irregularly churned.
Glittering highly with fat ..	..	Cream of varied degrees of acidity, as obtained by ripening in cans.
Cloudy .. .. .	..	Underworking.
	..	Bad coloring matter.
Fleckiness .. .. .	..	Over-ripening of cream and neglect of straining, whereby caseous matter finds a way into the butter. Inausufficient washing of butter in churn, made from under-ripened cream.
Mottled .. .. .	..	Slowly soluble grains of salt.

Defects in Firmness—

Soft and greasy .. .. .	..	Churning at too high a temperature and speed.
	..	Overworking and allowing butter to lie too long and become too hard before second working.
Dry and hard .. .. .	..	Winter butter made in low-temperature room, and over-salted and over-worked.
	..	Cows long in milk, with dry feeding, give hard fat.

Defects in Flavor and Smell—

	..	Want of ripeness of cream.
	..	Over-ripeness of cream.
	..	Under-washing of butter in churn.
	..	Presence of dirt in cream.
Rancidity and bitterness ..	..	Inferior coloring matter.
	..	Cheap salt, containing excess of calcium sulphate and magnesium chloride.
	..	Feeding cows upon sour feeding, as distillery refuse.
Tallowy, oily, and fishy ..	..	Deficiency in freezing and rapid thawing, and increased by exposure to strong light.
	..	Cows fed upon young and fresh clover or oilcakes.
Woody and mouldy .. .. .	..	Packing butter into unseasoned, damp boxes.
Musty .. .. .	..	Butter kept in damp places.

Experiments will be carried out with butter salted and colored with varying quantities and treated under different conditions; also the effect of freezing temperatures ascertained. All factories would find it very profitable to procure ripening cultures, and use them when butter is affected with foreign flavor.

Printing and Packing.—By experiment I have proved that butter printed by machine has a lower keeping quality than that printed by wooden hands. Although printing machines are absolutely necessary in factories, the drawback is the amount of air spaces left in the butter, which is an assistance to fermentation.

Packing.—Butter must only be packed into thoroughly seasoned and thoroughly dry boxes, as mouldy butter has not been an uncommon thing in the past. The best grease-proof paper only should be used. In packing the butter care is necessary in order that no cavities be left, as the effects of air would act injuriously.

Average Chemical Analysis of Butter. (Fleishmann.)

	From Sweet Cream, Without Salting.		From Sour Cream, Salted.	
	Unwashed.	Washed.	Unwashed.	Washed.
Water	15.00	15.00	12.00	12.50
Fat	83.47	83.73	84.75	84.62
Protein or caseous matter	0.60	0.55	0.50	0.48
Other organic matter	0.80	0.60	0.55	0.40
Ash, or ash and salt	0.13	0.12	2.20	2.00
	100.00	100.00	100.00	100.00

It will be observed that from the ripened cream and salted butter less water is got, more fat, less caseous and organic matter, thus showing the importance of ripening. With over-ripened cream less fat or less butter would be obtained, more water would be left in; also more caseous and organic matter; texture of butter would be soft and greasy, and keeping quality low.

Judging Butter.—The following may be taken as a suitable scale:—

	Fresh Butter.	Salted.	Boxed.
Flavor	50	45	55
Grain or texture	25	20	25
Solidity	15	15	20
Color	10	10	10
	100	Salting 10	10
		100	Packing 10
			130

THE DAIRY.

An Australian Specialist upon Pasteurising.

Mr. H. W. Potts, F.C.S., Euroa, Victoria, in answer to a letter from Mr. G. S. Thomson, Dairy Instructor, South Australia, gives his experience of the value of pasteurising milk and cream, as follows:—

Binney street, Euroa, Victoria, July 8th, 1898.

Dear Mr. Thomson—I have your letter of the 6th inst., on the subject of pasteurising.

During the whole of the past season every ounce of cream at our six creameries or collecting stations was pasteurised, as a result of a series of practical experiments.

We are putting in a Paasch pasturiser at each creamery to commence the next season with. During the past season we simply immersed the cream cans in a vat of hot water, the temperature being maintained by steam to 160° F. for ten minutes, and the cream gently stirred by a stick. The cans were then placed in the wagon, and taken at once to the central factory in this hot condition. From our furthest creamery, distance fourteen miles, we found the temperature to go down about 20° F. So long as the temperature does not get below 130° F it arrives at the factory in a sound condition, with the acidity rarely over .2 per cent. On arrival at the central factory it is at once passed over the DeLaval cooler, and brought down to 45° F. It flows into the vats, and afterwards it is allowed to reach the temperature of the cream room, which is kept at or under 60° F. Then the cultures are seeded into it, and ripening in the usual way in the vats is allowed to progress.

Our cream all last season, with the heat at 105° F. in the shade occasionally, arrived at the factory uniformly good, and made a large saving as against the old system, when we frequently on a hot day had to keep several cans back to make a second grade butter.

As far as the pasteurising is concerned there is no difficulty. Where the watchfulness and care is needed is in the development of the cultures. To facilitate the work and ensure a constant supply of sterilised air to the cultures, I have devised what our fellows call "Potts' culture can," and it has been applied so successfully that our directors are turning the secretary out of his office, and I am fitting it up as a bacteriological laboratory, and with appliances, so as to keep four sets of cultures, 10galls. each, going daily, in various stages of development.

At present I am experimenting with several imported cultures, all of which have just been imported for the occasion. So far I have found Hansen's most reliable, but my conclusions are not yet fully formed. I have made several good cultures also from local milks. But pasteurising, in my opinion, must come to the front shortly. It is the one clear hope of the trade.

At our last annual conference of managers a cask of Danish butter was opened, and pronounced really good by the best of our managers. By direction I analysed it, and found—

Moisture	10.5 per cent.
Curd	2.0 "
Salt	2.5 "
Butter fat	85.0 "

No trace of any preservative of any kind was found. It was pasteurised. Again, an old colleague of mine sent home a shipment of butter, part pasteurised and part ordinary. The market went up here, he reshipped the butter back to the colonies, and on inspection the pasteurised was in excellent condition, and far superior to the ordinary. These facts point to the general adoption of the system.

Our original experiments were with milk, but after pasteurising 50,000galls. we abandoned it for cream.

FERTILISERS FOR POTATOES.

Under the direction of the New York Agricultural Experiment Station careful experiments have been conducted to ascertain the results of the application of commercial fertilisers on potatoes. The experiments were conducted on four farms, in eighty plots, covering an area of eight acres of land.

It was found that about 10cwts. per acre of the mixed fertilisers (mentioned later) gave the most profitable results; the extra yield from plots treated with from about 5cwts. to 9cwts. per acre more did not pay for the cost of the extra fertiliser.

The evidence obtained in these experiments concerning the relative effect of the muriate and sulphate of potash upon the composition of the potato was inconclusive. The proportions of valuable plant food found in the tubers were not influenced appreciably by the amount or kind of fertiliser used.

It is stated that if the tops are returned to the soil an average potato crop of 200bush. per acre removes about 36lbs. nitrogen, 13lbs. phosphoric acid, and 60lbs. potash. Many farmers on Long Island have been applying as much as 1 ton of high-grade superphosphate per acre, and the Station experiments have proved that, taking only the immediate crop into consideration, such heavy manuring is not profitable.

Two formulæ were used, in different quantities, No. 1 being similar to that in general use by the Long Island Farmers' Club, and No. 2 being an attempt to supply the important elements of plant food in the proportions and amounts needed for a profitably large crop.

Ingredients.		Composition.	
Nitrate of soda	127lbs.	Nitrogen	4 per cent.
High-grade dried blood..	440lbs.	Soluble phos. acid..	8.4 per cent.
Acid phosphate	1,000lbs.	Potash ..	9.2 per cent.
Sulphate of potash.....	400lbs.		
Gypsum	33lbs.		
	<u>2,000lbs.</u>		

Ingredients.		Composition.	
Nitrate of soda	192lbs.	Nitrogen.....	6.8 per cent.
High-grade dried blood..	800lbs.	Available phos acid	4.9 per cent.
Acid phosphate	570lbs.	Potash ..	10.1 per cent.
Sulphate of potash.....	400lbs.		
Gypsum	38lbs.		
	<u>2,000lbs.</u>		

In each case alternative formulæ were tried, muriate of potash being substituted for sulphate in equal quantities, leaving the composition identical, except that the percentage of potash was raised to 10.4 and 10.31 respectively. It will be seen that practically the difference between Nos. 1 and 2 is that the proportions of nitrogen and phosphoric acid vary greatly. The results show a uniform and material advantage in favor of the Long Island (or No. 1) formula, both in vines and tubers.

The following shows results of the experiments on two farms where the conditions of test were most favorable :—

	No. 1.	No. 2.
500lbs. per acre ..	163.8bush.	125.5bush.
1,000lbs. per acre ..	184.7bush.	166.2bush.
1,500lbs. per acre ..	189.5bush.	166.8bush.
2,000lbs. per acre ..	190.4bush.	178.4bush.

Check plots, unmanured, gave 113.1bush.

It will be seen that the first 500lbs of fertiliser in No. 1 increased the crop to the extent of 50·7bush., the second 500lbs. added another 21bush., while the third and fourth extra amounts only gave increase of 5·2bush. and 1·1bush. respectively. The potatoes were sold at 75 cents (say, 3s. 2d.) per bushel for marketable sizes, and 25 cents (1s. 0½d.) for small; and it was estimated that the cost of the increased crop on the plots treated with 1,000lbs. of fertiliser came to 20 cents per bushel. The fertiliser used was estimated to cost on an average about £5 per ton. The soil on which the experiments were carried out was of a light character.

From these reports it would appear that the best results are obtained from fertiliser giving the following ingredients:—

40lbs. nitrogen.

182lbs. soluble phosphate = 84lbs. phosphoric acid (approx.).

92lbs. potash.

The following formulæ will show approximately how these fertilising ingredients can be obtained from the principal manures offered in South Australia, the guaranteed analyses of the various manures given by the sellers early in the year being accepted as correct:—

		Cost.
		£ s. d.
(1)		
Guano super.....	800lbs. = { 181½lbs. sol. phos. }	1 6 9
Nitrate of soda	150lbs = { 16½lbs. nitrogen }	0 18 9
Muriate of potash . . .	184lbs = 92lbs. potash	1 1 4
		£3 6 10
(2)		
Sugar Works super . . .	520lbs. = 18½lbs. sol. phos.	1 5 6
Nitrate of soda	250lbs. = 40lbs. nitrogen	1 11 3
Muriate of potash	184lbs. = 92lbs. potash	1 1 4
		£3 18 1
(3)		
Chemical Works super..	535lbs = { 182lbs. sol. phos. }	1 6 8
	{ 21½lbs. nitrogen }	
Nitrate of soda	120lbs. = 19lbs. nitrogen	0 15 0
Muriate of potash	184lbs = 92lbs. potash	1 1 4
		£3 3 0
(4)		
Kangaroo Island guano .	420lbs. = 182lbs. to 190lbs. sol. phos.	0 8 6
Nitrate of soda	250lbs. = 40lbs. nitrogen	1 11 3
Muriate of potash	184lbs. = 92lbs. potash	1 1 4
		£3 1 1
(5)		
Bonedust	384lbs. = { 182lbs. sol. phos. }	0 18 0
	{ 13½lbs. nitrogen }	
Nitrate of soda	175lbs. = 28lbs. nitrogen	1 2 0
Muriate of potash	184lbs. = 92lbs. potash	1 1 4
		£3 1 4
(6)		
Thomas phosphate	466lbs. = 182lbs. sol. phos.	0 15 7
Nitrate of soda	250lbs. = 40lbs. nitrogen	1 11 3
Muriate of potash	184lbs. = 92lbs. potash	1 1 4
		£3 8 2

If sulphate of potash is used about 150lbs. to 175lbs. should be substituted for muriate, and will cost 3s. to 4s. more. If potash is supplied in the form of wood ashes 12cwts. to 15cwts. per acre will be required. If sulphate of ammonia is substituted for nitrate of soda, the required amount of nitrogen can be supplied by a one-fourth less in weight of the former at a reduction in cost of from 5s. 6d. for No. 3 to 12s. for Nos. 2, 4, and 6.

It will be seen from these figures that the fertilising ingredients required cost here from £3 1s. 1d. to £3 18s., against £2 5s to £2 10s. in New York.

UNDERGROUND GRUBS.

During the past few weeks the larvæ of the underground grass beetle have been doing serious damage to the crops on Yorke's Peninsula, and it is estimated that several hundred acres of wheat crop have been destroyed, as well as a quantity of grass, and it is stated that some of the worst affected paddocks are as bare of any vestige of crop as the fallows. As the grubs do not come to the surface, but feed on the roots of the plant, no system of poisoned baits is likely to do any good; in fact, it is doubtful whether there are any serviceable remedies while they remain underground. Harrowing and rolling with a heavy roller might prove beneficial in destroying some of the grubs. In America it has been found that spraying the affected patches with kerosene emulsion, and then watering the ground from time to time, is effectual in destroying some apparently similar grubs. This is at least worth a trial here, though the area of infestation makes it doubtful whether the remedy, even if successful, is not too costly. The kerosene emulsion was used at strength of one in sixteen.

There is, however, one way in which this pest can be very considerably reduced. In October or November the perfect beetles appear and congregate in great numbers towards evening about trees, posts, &c., and can be easily caught with nets and traps in hundreds. As each female lays probably fifty eggs it can easily be understood how the destruction of a few thousand beetles on one farm will keep the pest within bounds. The benefit may not be immediately apparent, as the insects are in the ground for from two to four years undergoing their various changes before they appear as beetles, and of course the present damage cannot be prevented by these means.

The beetles belong to the same order as the well-known cockchafer, which at times in other countries does serious injury to grass and trees both in the grub and in the beetle form. They are also known as May beetles, and in America as white grubs, there being several different species classed under these names. The grubs doing the mischief on Yorke's Peninsula are about 1in. long, whitish in color, with a dark line along the middle of the back, the last two joints being dark-brown. The grubs remain curled up in the soil about 1in. to 2in. below the surface. Crows and rooks destroy immense numbers of the grubs.

WATERMELONS.

In a bulletin issued by the Georgia Experiment Station Mr. Hugh N. Starnes gives much interesting information concerning the cultivation of watermelons, from which we take the following:—

SOIL.—While the watermelon will readily accommodate itself to a variety of soils, the best is a warm, light well-drained soil on a clay subsoil, which gives up its moisture little by little for the benefit of the plant. Wet soil is the worst enemy of the melon, but at the same time the soil must not be too dry. A

soil rich in humus will produce size at the expense of quality. At least four years should intervene between melon crops on the same land. The land should be thoroughly prepared before seeding.

MANURING.—The best fertiliser for a melon crop is a crop of cow peas on the land the previous year, and next to this a good dressing of stable manure ploughed under in the autumn. The addition of $3\frac{1}{2}$ cwts. of super or other acid phosphate and $3\frac{1}{2}$ cwts. kainit per acre will supply any deficiency of phosphoric acid and potash in the manure, and will make a vast difference in the result. Where commercial manures alone are used the addition of $1\frac{1}{2}$ cwts. to 2 cwts. nitrate of soda will be required.

SOWING.—In the open, seed should be sown with the advance of the warm weather; though, if early melons are desired, the plants must be forced in a frame, and transplanted when the weather is warm enough. The seed must not be planted more than 1 in. deep. Pushing the seed in too far is a very common fault.

CULTIVATION.—After the plants are well up break up the surface of the soil, and keep it loose as long as possible.

HOW TO TELL A RIPE MELON.—This is most important, and comes largely by experience and instinct. To attempt to tell when a melon is ripe by the appearance of the tendril nearest the fruit is quite unreliable. Perhaps the best test is by the sound. The flat, dead sound emitted by a melon when “thumped” is the readiest indication of ripening and the one most depended on. If the resonance is hollow, ringing, or musical, it is certainly proof of unripeness. Another method is to examine the white blotch formed where the melon rests on the ground. When this begins to turn yellowish and become rough, pimply, or warty, with the surface sufficiently hard to resist the finger nail when scratched, it is a fair indication of ripeness. Another test, which, however, must not be tried on melons for distant markets, is steady pressure with the palm of the hand on the melon as it lies on the ground. If instead of resisting solidly, the interior has a tendency to yield, accompanied by a crisp crackling—half heard, half felt—as the flesh parts in sections under pressure, the melon may be pulled with absolute confidence.

VARIETIES.—Numerous tests with different varieties leads to the conclusion that for shipping purposes Lord Bacon comes first, Kolb's Gem next, and Rattlesnake third; these, however, are not the best for quality. After very careful tests the following are classed as the best for local market or home consumption:—Sibley's Triumph, Seminole, Dixie, Jordan's Gray Monarch, and Plinney's Early. For earliness, Memphis comes first, being large, very early, and of good quality. For size, Duke Jones comes first, Lord Bacon second, while for total yield the latter is top.

STORING.—Melons may be kept in good condition for a long period by planting a thick-rind variety late in season, handling fruit carefully when pulled, and storing in a cool cellar on some dry, yielding substance. One grower who has been very successful in storing melons states he aims to raise melons one summer that he can keep until the following crop comes in.

HOUSEHOLD HINTS.

ORANGE MARMALADE.—Take two dozen good-sized oranges which have a rather thin rind. With a sharp knife remove the peel from eight of the oranges and cut it into strips, also the peel of two lemons; simmer this peel in water until it becomes tender. Peel the remainder of the oranges and cut all into slices, removing the pits. Put the sliced oranges with their juices and the juice of six lemons into an agate or porcelain lined kettle, set over the fire

and cook rapidly until mixed to a pulp; rub through a colander and return to the fire, adding 8lbs. of granulated sugar. Boil steadily and stir constantly until very thick, drain and add the strips of peel, boil for two minutes longer, put into jars, and seal.

CANDIED PEEL.—Choose sound, fresh lemons or citrons, and cut them into quarters lengthwise. Remove all the pulp, and soak the rind in salt water for three days, and afterwards in cold water for a day. Next boil it in fresh water until it becomes tender, then drain the rind and cover it with syrup made with 1lb. of sugar to a quart of water. The rind will begin to look clear in about 30min., when it must be again drained. Now make a thick syrup, allowing 1lb of sugar to a pint of water. Boil the rind in this over a slow fire until the syrup candies. Then take out the rind, drain it, and dry in a cool oven.

HOUSEHOLD SOAPS.—Procure 10lbs. Greenbank's powdered caustic soda; add this to 4galls. rainwater. This will become very hot at once. When cooled until just warm to the hand, pour it into a vessel containing 70lb. melted clarified grease or tallow at 98° F., and free from salt. Stir with a flat piece of wood until well mixed and appearing smooth. Then pour it into a shallow box lined with calico to prevent sticking to the sides and bottom. Cover with blankets and keep in a warm place for three or four days. Then lift out of the box, remove the calico, and cut into bars by aid of a piece of thin wire. This will make about 120lbs. soap. For mild toilet soaps use 7½lbs. grease or tallow. For a still better class of toilet soap use 60lbs. best tallow and 15lbs. cocoanut oil or cottonseed oil with the soda as above. When nearly cool, add coloring matters and perfumes mixed in a small quantity of alcohol. A short list of these appeared in July, 1898, issue of this journal.

HORTICULTURAL NOTES.

Sparrows like seeds and grain better than any other food, but as they cannot find much of that kind of provender during the wet months they attack peas, cabbages, and other green vegetables. They are hungry for grain, however, and will eagerly consume poisoned wheat if it is properly prepared for them. Next month they will begin to breed; therefore every "head of a family" destroyed now will tend to diminish the increase of this pest. A quarter of an ounce of strychnine is sufficient to poison 40lbs. of wheat; small grain is much preferable to large. Mix the poison with ¼oz. of acetic acid in a pint of hot water. When dissolved add the solution to 3galls. water in which 4lbs. sugar have been dissolved. Soak the seeds in this until the whole of the water is absorbed. Dry the grain on a sheet of galvanized iron placed in the sun. Remember that everything that has been used or in contact with the strychnine is dangerous to all animal life. Burn the tin can in which the solution was made, and wash the other articles with plenty of water in which washing soda has been dissolved. Strychnine is too dangerous to be in the possession of any but the most careful hands.

In Liverpool, England, 48,000 cases Valencia oranges were sold in one week on an advancing market. These contained 420 in small and 714 in large cases. Besides this 3,000 barrels of apples were sold in one day. From July 1 till January 4, year before last, 1,172,638 barrels apples were received, but last season only 324,231 barrels, owing to shortage in American crops.

Denmark cultivators should consider whether it will pay to secure the oils and perfumes that can be manufactured from the leaves, flowers, and fruit of members of the citrus family which at present are allowed to go to waste. In connection with this there are certain medicinal herbs and perfume plants

which are highly profitable to grow in suitable localities, and it is more than probable that Denmark is one of the localities where such plants *can* be profitably grown.

Californian raisin-growers have to face the price of $1\frac{1}{4}$ c. to $1\frac{1}{2}$ c. per pound, packed and delivered, at San Francisco; but, owing to high prices of horse, cattle, and pig food, through drought, they find more profit in feeding raisins to those animals. Crushed barley has been selling at 30dols. to 32dols. per ton; raisins, 20dols. per ton at Frisco and 17dols. to 18dols. at Chicago. Twelve pounds raisins are equal in food value to 20lbs. crushed barley.

The liquorice-root crop of Batoum, in Russia, for the season 1896-7, was about 11,000 tons. Large quantities are also produced elsewhere. This plant **grows well on the sandy soils near the seacoast of Australia.** The question arises, **would its cultivation pay?**

Rhubarb has been made to produce a crop of stalks from seed sown in early spring and mature in autumn. The process was to raise plants under glass; plant out, directly frosts were over, in rich soil, regularly watered. Rhubarb varies when thus raised, and a smart grower would select the best plants and multiply from these by division of the crowns.

When making heavy prunings of trees leave the surfaces rough, and cover the wounded surface with lead paint, which should then be sprinkled with fine sand. This is the best as well as the cheapest dressing that can be used.

Olives are used largely as food in continental Europe, and to some extent in California, both pickled and dried. The latest method of drying is to split the olives, soak them, in fresh water for a few days, then in brine for a few days, and then dry them in the sun. This extracts the bitterness, and the fruit can be eaten with bread, or made into cakes and fried like steak, or put into skins like sausages, or used in stews, soups, &c. The fruit should be fully ripe before being dried or pickled, as it is richer and more nourishing than when cured green. Recipes for cooking and using olives will be acceptable.

Those foolish people who place upon the market wormy, scaly, scabby, and otherwise diseased and rubbishy fruit and vegetables, for which they realise only bedrock prices, glut the market with stuff which disgusts would-be purchasers, and very considerably reduces the value of first-class produce. They had far better feed pigs, &c., with this rubbish, or else make manure of it. By limiting market supplies to really creditable products the demand will be greatly increased, and far better prices will be obtained. "It is a dirty bird that fouls its own nest," and yet there are many men who will glut a shilling market for to-morrow for the sake of selling a pennyworth of rubbish to-day.

SWEET MELONS.—Americans call these "musk melons," "cantaloupes," and "citron melons." At one time the musk melons formed a class by themselves, being long and smooth, with sometimes a little netted. The cantaloupes (or rock melons) were usually hard-skinned and rough. "Cantaloupe" and "Citron melon" now appear to be stock names for every kind of sweet melon. Well-drained soils with considerable humus or well-decayed vegetable matter are best for sweet melons of all classes; the lighter soils being preferable. The great secret of success, when the soil is suitable, is frequent loosening up of the surface, and to avoid moving the runners or vines. If once the growth is checked the plants seldom regain vigor. Put in about twenty to twenty-five seeds in each circle of 15in. diameter, at just 1in. deep. When the plants show the fourth leaves remove all but five plants; water regularly, cultivate very often, give a little weak liquid manure at the roots sometimes, and put in pegs to prevent the wind shifting the vines. Treat cucumbers the same way.

SQUASHES.—Squash is Yankie for trombone, marrow, and similar fruits of the cucurbitaceous order. Many of these fruits are cooked whole, and then broken into, the pith and seeds are removed, and the pulp is squashed up with butter, salt, and pepper, and served up at table. Squashes require a very rich soil, light, but with a clay subsoil. Prepare the land some time before sowing, and in September put in a dozen seeds in each circle of 18in. at 15ft. to 2 ft. apart for the larger sorts, and 8ft. apart for the pattypan and bush varieties. The seeds should be 1in. deep. It is good to plant maize in rows between the hills to prevent wind blowing the vines over. Never allow the vines to shift the least bit. Cultivate frequently 2in. deep, not more, but never nearer the plants than the length of the longest shoots. Give liquid manure at the roots, and supply enough water to keep the plants always rapidly growing. Keep bees to fertilise the blossoms.

CURRENT-GROWING IN THE HILLS.

BY W. MERCHANT, NORTON'S SUMMIT.

It is only within the past few years that the cultivation of the English garden currant has been anything like payable in the colony. Even now cultivation is mainly confined to the red varieties on account of the unfruitfulness of the others. Up to the present the cultivation of the black currant, even in soils and situations well suited to their growth, has been only moderately successful, and future success depends upon the introduction of new and more fruitful varieties. This lack of fruitfulness on the part of varieties of black currants was, until about twelve years ago, the same trouble with the red currants, but about that time new varieties were obtained from England, and proved so fruitful that planting has extended from year to year, until now the supply is fully equal to the demand, and any extension of the area under cultivation must depend upon the preserving companies making use of the fruit to a much larger extent than in the past.

The main points the intending cultivator has to consider are selection of suitable varieties and site. There are a number of good bearing varieties of red currant, but the names have become much confused. Among the best are *La Fertile*, *Reine Victoria*, *La Versailles*, and cuttings can be obtained from any growers in the hills, though it is now rather late in the season. When in England in 1896, I visited a large number of gardens to see if I could get prolific varieties of the other bush currants, and was surprised to see so many really satisfactory kinds in bearing, especially black currants, and resolved to introduce, if possible, some of the best. After two attempts I have succeeded in getting one of the best to grow, and if on trial it proves suited to the district and as fruitful as the red currants will be of great value. In regard to soil and situation the lower slopes of the cool gullies facing south, and on the edges of the swamps, are most suitable. A northern aspect is altogether unsuitable. The soil should be a good free loam with loose subsoil, compact, stiff soil being unsuitable. Plants are propagated from cuttings of the previous season's wood, 8in. to 10in. in length, all but three or four top buds being removed. They strike readily in good nursery soil, and are ready for planting out at one year old. Care should be taken when setting out the plants, especially in good soil, to give them plenty of room, say, rows 8ft. apart, and plants 8ft. to 8ft. apart in the rows. With red currants the usual practice is to plant between the fruit trees, so as to realise some returns during the years the fruit trees are coming into bearing. After-cultivation consists in keeping the soil between the plants loose, and in pruning. In regard to pruning, each grower seems to have a method of his own, the idea of course being to induce fruitfulness, but with the black currant success has not attended their efforts.

NOTES ON VEGETABLE-GROWING FOR AUGUST.

BY GEORGE QUINN.

At frequent intervals during fine, sunny weather the hoe should be used to stir the soil between the rows of all growing vegetables. The weeds are not only being checked or killed by this operation, but the air and sun's rays penetrate more easily, and thus assist the plant food in the soil about the roots to become more quickly available to the plants. When about to perform this work the growth of most vegetables can be stimulated by sowing a thin dressing of some quickly-dissolving manure along the rows, and working it in as the hoeing proceeds. Cabbage, cauliflower, turnip, peas, beans, lettuce, onions, parsley, and potatoes are all benefited by liberal dressings of superphosphate, and sulphate of ammonia is also a good manure for all of these excepting the peas and beans.

Cabbages or cauliflowers that have been planted somewhat high should be earthed up to prevent the wind swaying them injuriously.

Fresh sowings should be made of peas, carrots, parsnips, broad beans, red and silver beets, turnips, lettuce, cress, and onions. A late planting may be made of cabbage and cauliflower on the plains country, but the season is somewhat advanced now. Onions should be transplanted whenever ready, and those patches of soil that have shown signs of "onion sickness" should not be planted. This disease is caused by myriads of microscopic eelworms living in the soil, and they attack the bulbs, causing them to rot away completely. The only remedy is a change of crop and the addition of lime to the soil.

Potatoes may be planted now in most localities. The sets should be "started," but not sufficiently to allow the started eyes to be broken in handling. A good dressing of bonedust sown along the furrows upon the tubers is recommended as being highly beneficial.

Asparagus beds may be set out now, just when the young plants show signs of starting to grow. The ground must be well trenched for this plant. A free sandy loam is best, and only thoroughly decomposed stable manure should be added at time of planting or preparation. A good sprinkling of common salt should be given, say two handfuls to each square yard of surface.

In localities where late frost are seldom experienced sowings may be made of edible potted beans, either of the dwarf or runner sections.

Preparations should be made for raising summer vegetables, and sowings of tomatoes, cucumbers, melons of all kinds, marrows, pumpkins, chillies, and egg fruits.

A frame is necessary, and artificial heat should be applied. No costly appliances are required. A portable frame placed upon a heap containing several loads of fresh stable manure, and more manure banked around it firmly, will provide heat and shelter (see illustration in July issue of this journal.) The inside of the frame should be filled to within say 8 in. of the top with good loam. The frame should slope down towards the north. The seeds are best sown in 4 in. pots plunged in the loam. The best compost is a free sandy loam containing a fair percentage of rotted vegetable humus. The pots should be well drained with charcoal or broken pots or bricks. A glass or calico light should be placed over the top of the frame, and care taken not to apply too much water to the young seedlings when growing. The danger of "damping" off is the greatest difficulty experienced in raising early summer seedlings, and all watering should be done in the morning, and, as far as possible, on fine sunny days.

The ground should be prepared for main crops of melons, and as they thrive in soils rich in vegetable humus it is a good plan to procure all the weeds, &c., at hand, and dig them into the ground at once, so that they may be quite decomposed when the young melons are set outside.

ORCHARD NOTES FOR AUGUST.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

The planting and pruning of all deciduous trees in late districts will be completed this month.

This remark applies chiefly to apples and pears, as I take it those localities suited to the profitable production of peaches and apricots are much earlier, and consequently these operations are already finished.

If any reader of these notes has not yet selected his trees, let me urge upon him not to plant many varieties; choose a few good sorts suited for his situation and intended uses, and plant only these.

There is not much to be written now concerning methods of pruning apples and pears. The young trees are best shaped in a manner similar to other trees, viz., with short stems and low sturdy branches.

The trees should be cut severely upon the main arms during the first three or four years to induce a sturdy formation. Care should be taken not to clean off lateral growths upon the main arms. If these laterals are cut over the base buds, and, where rampant growth renders it necessary, broken during the following summer, fruiting spurs can be retained down to the main stem.

In nearly all of the fruit-growing districts in this colony where the surface soil has been thrown open deeply by an early winter's ploughing the subsoil has received a good soaking, and with a little more rain—which may be reasonably expected during the next three months—there is every prospect of the season proving highly favorable to the proper development of orchard crops. Those orchardists who intend ploughing a second time should begin during this month, and with a shallow furrow throw the soil back in its natural position well up to the stems of the trees.

In very early districts in the north it may be necessary, during August, to begin scarifying down the lumpy soil ere it becomes hardened and dry. The exact time to do this is a question which can only be settled by personal knowledge of each locality, but the object to be sought is to break down the soil to a fine mulchlike tilth before the increasing strength of the sunshine shall draw away vast stores of moisture through the roughly-broken surface. Once the importance of this precaution is realised, the individual orchardist can, in every instance, carry out the work satisfactorily without any great mental effort.

It may be necessary, in early localities, to start grafting this month; but in most situations the beginning of next month will be suitable for deciduous fruit trees. Towards the end of August the citrus trees begin to show signs of returning vegetation, and the evidences of young growth showing in the joints is a very good guide to the most suitable time to transplant these trees. They should only be planted upon perfectly-drained soils, and must not be planted deeply, as the accumulation of water, either by rainfall or irrigation, around the stem will almost inevitably lead to "collar rot," while the excess of water in an undrained soil rots the roots after a few seasons. In September, 1897, number of this journal an illustrated article on the subject of planting citrus trees was published, and I beg leave to refer readers to the ideas expressed at length therein. In orangeries that have been relieved of their crops the annual pruning may be started without danger to the trees. All water shoots upon the main limbs should be removed, dead twigs carefully cut out, and where the crowns are too dense a judicious thinning out will be beneficial, because of the admission of necessary light and air.

Young citrus trees are not usually pruned until they come into bearing, after which any branches reclining upon the ground should be removed, but the main stem should not be exposed to the direct rays of the summer's sun.

There is every indication of the coming season being suitable for the rapid development of insect and fungus life. Spraying with Bordeaux mixture should be systematically carried out upon deciduous trees before the buds fully expand. The stem and limbs of apple, pear, and quince trees, and any others of different kinds growing near these, should be scraped in those orchards infested by codlin moth. If peach aphides appear on peaches, nectarines, etc., the tobacco wash should be used at once upon them at frequent intervals. About 3lbs. of strong refuse tobacco, 2lbs. soft soap boiled, strained, and diluted to make 12galls. of spray wash, is a well-tried formula; but the whole secret of repressing peach aphides lies in "keeping at them" every day or two until they disappear or their natural enemies come upon the scene in sufficient numbers. Black aphides on orange trees should be treated similarly.

CARE OF LEMONS AND ORANGES.—The most important point in keeping citrus fruits good for a long time is gentle treatment all through. It would pay well to wear woollen gloves whilst handling the fruit, to prevent the finger nails bruising the skin. All fruit should be clipped close at the stem—never pulled. After rain or irrigation, wait several days, and never gather whilst the fruit is damp, or hot, or possessing a sappy skin. Lemons should be harvested when they would barely pass through a 2½ in. ring, and irrespective of color. If quite green they will color-up in the storehouse. Lay each fruit gently in the shallow lined basket or tray, and place in the shade, so that the sun cannot shine upon it. Gather only those lemons that are of the proper size. When carrying to the fruithouse be careful to select the smoothest track, to avoid jolting which would cause bruises on the fruit. Pack carefully in shallow boxes or trays; pack one over the other until the skin is toughened, then wrap carefully in white tissue paper; pack in cases, and pile up till marketed. The house should be cool, dark, and ventilated near top and near the floor. Oranges and lemons very carefully picked, toughened as above, wrapped, and packed in single layers on shelves in a cool dry cellar have been kept in this colony for eight months in perfectly good condition.

UPSETTING THE BALANCE OF NATURE.—Many people complain that moths, caterpillars, and other insects are much more numerous, destructive, and annoying than they were in the early days of settlement of this colony; and so they are, but old colonists will remember that bats were very numerous in the early days, occupying hollows in the numerous large eucalypts existing on the plains as well as in the hilly country. These bats lived upon night-flying moths. The trees and bushes were occupied by millions of small insectivorous birds, and larks, quails, dotterell, plovers, magpies, &c., as well as thousands of martens or swallows, constantly lived upon the moths, flies, gnats, caterpillars, grubs, &c., which at present thrive unchecked, because all these useful birds have been driven away through destruction of the trees, shrubs, and bushes which sheltered them. Even the black crow seems doomed to annihilation through the blind perversity of people who will only regard the small depredations he commits, whilst they utterly ignore the unceasing and wholesale destruction carried on against the insect ravagers of their crops.

"FIGHTING PESTS WITH NATURE'S WEAPONS."—Experiments are being conducted constantly by the scientists connected with the American Department of Agriculture, and several practical results have been arrived at. The originator of the idea was our South Australian friend, the late Frazer S. Crawford, who discovered the *Lestophonus* parasitic fly, which led to Albert Koebele being sent over to Australia in search of other parasitic friends of the horticulturist, and found the famous *Novius* (*Vedalia*) *cardinalis* and a number

of other "ladybird" beetles which feed upon scale and other coccid insects. Since then, the Americans have discovered various fungi which seriously affect the health of horticultural pestiferous insects, and by "cultivating" these fungi, they either infect a large number, which are let loose to spread the disease amongst their species in fields or orchards, or else they make a large bulk of "culture" and spray it upon trees and crops with a similar effect. There appears to be great promise of efficacy in this latter method, which is an entirely new departure in economic entomology.

PRECAUTIONS AGAINST CODLIN MOTH.—Every caterpillar of the codlin moth found in a bandage or other place has already spoiled an apple, pear, or other fruit. The object should be first to prevent the advent of the moth which laid the eggs from which this and many other caterpillars emerged, and secondly to trap, by bandages, &c., every caterpillar which has been produced through failure of the before-mentioned effort. At the present moment there are many thousands of caterpillars hidden away in cracks, knotholes, and elsewhere, just changing into chrysalides and waiting for the first apple and pear blossoms to burst from their buds. Then these chrysalides will be changed into moths, which will fly about in the dusk and deposit their eggs on the newly-forming fruit. After a few days from each of these eggs a caterpillar will emerge, thinner than a human hair, and shorter than a comma in this paragraph. This little insect will soon begin to nibble the surface, and if the surface has been sprayed properly with Paris green or arsenite of lime it will die, and thus the fruit will be saved, but the trees must not be sprayed until the petals or "leaves" of the flowers have fallen off. If the caterpillar is not killed it will grow to full size, emerge from the fruit, hide, change to a chrysalis, then become a moth and lay a lot more eggs on fruit, which also will be spoiled. To prevent all this devastation, search should now be diligently made for the hidden caterpillars; traps should be fixed abundantly in the orchards to catch the moths; and the trees should be bandaged and properly sprayed. Traps are effective in catching many kinds of moths. Any salmon tins or open-mouth bottles will do. Make a thick syrup with 15lbs. honey or sugar in 1gall. of water, and to each trap containing $\frac{1}{2}$ pint of syrup add a teaspoonful of apple or pear that has been boiled soft.

TIES FOR TRELLISED VINES.—In reply to an inquiry as to the best material to use to tie trellised vines to the wires, Professor Perkins advises that in general practice the best thing to use for the yearly rods is No. 20 wire, and for the stems binder twine or strong strips of cloth to fasten them to the wires.

PHYLOXEROL.—The United States Consul at Geneva, Switzerland, informed his Government lately that a Swiss citizen had discovered a perfect remedy for phylloxera on vines, which had been certified by the mayors of the villages of Moens and Divonne-les-Bains, Ain, France, to have killed the phylloxera on roots of vines which had been very seriously affected. The vines made vigorous growth, and perfected crops of excellent fruit for two years, whilst vines in the immediate vicinity, but left untreated, were killed by phylloxera. It is stated that the "phyloxerol" acts as a strong fertiliser, and kills all insects amongst plants of all kinds. The agent for the inventor is M. Eugene Courvoisier, Versoin, Canton of Geneva, Switzerland. It is said that 55lbs. of phylloxerol is sufficient for an acre of vines for two or three years, and that the cost is moderate.

INSECT POWDER.—Gather the flowers of the *Pyrethrum cinerariaefolium* when they are only half opened. Dry them perfectly in a shed, because they will spoil with mould or mildew if the least damp. When quite dry grind the flowers in a coffee mill kept exclusively for the purpose, and keep the powder in an air-tight jar or can. The virtue of the powder is in the flower bud only.

THE USE OF BORDEAUX MIXTURE IN SOUTH AUSTRALIA.

BY GEORGE QUINN.

There is no operation in the horticultural practices of this colony that has secured so general and rapid adoption as the use of Bordeaux mixture for prevention of the ravages of fungus diseases of orchard trees. Although its beneficial effects upon vines affected by downy mildew had been noted several seasons previously, it was not until as late as 1885 that this compound of lime and copper sulphate had established its claims upon French vignerons as a preventive of that destructive fungus.

From about the time mentioned above the orchardists of this colony were becoming considerably alarmed at the increasing ravages of different fungoid growths upon their crops. The "scab," "black spot," and various other names under which the fusicladiums were known, were reducing the crops of apples and pears below a payable limit. Apricot fruits were badly injured by the raised pustules of shothole fungus, and peach trees, through the frequent shedding of "curled" leaves caused by peach curled fungus—*Exodascus deformans*—became enfeebled, and at a very early period during each season's growth lost large quantities of fruiting wood and fruits. Various remedies were suggested and not a few tried by the more enterprising orchardists and investigators.

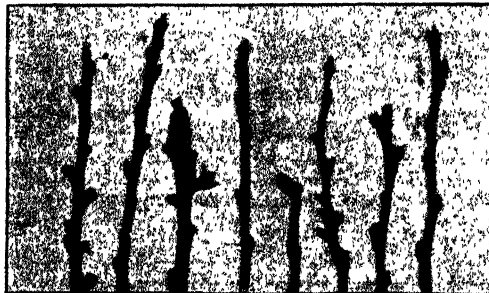
Solutions of caustic soda, lime, copper carbonate, concentrated ammonia, sulphates of iron and copper were each tried in different localities with varying success; but, as far as records go, it appears that a committee appointed by the Angaston Branch of the Agricultural Bureau at the instigation of the General Secretary, about November, 1890, consisting of Messrs. W. Sage, F. C. Smith, and A. B. Robin, was the first attempt at a systematic trial of this valuable fungicide.

In July, 1891, this committee began operations upon badly-diseased trees in the orchard of Mr. James Trescowthick, near Angaston, and although the spring was humid and the conditions highly favorable to the development of the fungi under treatment, the results were fairly satisfactory. The following season a greater number of trees were operated upon with better results, and from thence onward the treatment by spraying with Bordeaux mixture has been adopted, until at the present time very few valuable orchards are found in the colony in which the annual dressings are not applied to the trees. The results have in most instances been remunerative, and the annual production of sound fruit in the province over and above that obtained prior to its introduction may be safely valued at many thousands of pounds. This statement is made after careful calculations have been entered into with the orchardists themselves who have benefited by its use; and I have no hesitation in asserting that the establishment of this practice alone in orchard work is in itself ample justification for the existence of the Agricultural Bureau. I am perfectly aware that many practical orchardists are yet not fully convinced of its value, and ascribe the immunity enjoyed by sprayed trees to climatic or soil conditions; but as it has been proved absolutely by scientists that the solutions of Bordeaux mixture as used for spraying will destroy the germinating power of the spores of the above-named fungi when they have been enveloped in it, I do not think it is necessary to enter into a controversy on this point. There is not the least doubt that the dry weather experienced during the springs of recent years has acted in a repressive manner on all fungi parasitic upon fruit trees; in fact the drying action of the sun rays and winds but lightly charged with moisture is almost precisely the same as the chemical re-action set up by the ingredients of Bordeaux mixture. Many failures in using Bordeaux mixture arise from applying

the dressing at a time when the fungus is least assailable. For instance, I have seen peach trees with their foliage literally painted blue, and yet the "curl leaf" did not appear checked, and ran its course of "blistering" growth until the leaves fell from the trees. I have also seen grape berries rendered quite unmarketable by the application of the mixture after the "black spots" of Anthracnose were visible, and yet the fruit was not saved. Similar observations could be quoted in connection with apple fusicladium and "shothole" of the apricot. Failures are often recorded in wet districts, where for many weeks rain falls in varying quantities almost every day. Here, of course, the action of the fungicide is destroyed by its being either washed away completely or being diluted to a harmless state of weakness. After making careful inquiries among the fruitgrowers in all parts of the province, I have come to the conclusion that nearly all of the failures to secure good results from the use of Bordeaux mixture may be attributed to the following causes:—

1. Applying the dressings at a time when the disease was last assailable.
2. Failing to apply the mixture in a proper condition, or manner.
3. Neutralisation of the action of the mixture through excessive moisture.

To correct the first, a study of the life course of the fungus is necessary. The growths of those parasitic fungi, known to gardeners as apple and pear "scabs," apricot "shothole," and peach "curl leaf," are endophytic, that is, they are made amongst the cells of the leaf or twig or fruit, *beneath the epidermis, or between the surfaces of the leaf*; consequently it will be readily understood that to destroy the fungus growing within the tissues those surrounding tissues must also be destroyed. This would seem to make the treatment hopeless, but further observation shows that, although the growing or vegetating portions of the fungus live within the tissues, when it sends off spores to continue its species, these are borne on growths which force themselves through the surface to the outer faces of the attacked portions, and thus the spores are set free. These spores lodge in every conceivable crevice, axil, and bud where they may fall or be carried by the wind. In such a condition they may rest for a long time, and in most instances the forces of nature which stimulate growth or impel dormancy in the fruit trees act similarly on the fungi which live parasitically upon them. This is the key to successful treatment. The dormant spores lodged in the positions indicated are open to the effects of the fungicide if thoroughly applied at this stage. It is frequently advised in horticultural papers to apply this mixture in winter, but for reasons I shall endeavor to explain by means of an illustration, I am convinced the midwinter applications are not the most successful. I have made careful inquiries from those who have tested the mixture thoroughly and practised its use the greatest length of time in our colony, and they all agree that a strong dressing, *when the buds are opening*, is the most efficacious.



In this illustration the first two figures on the left side are photographs from nature of peach twigs. No. 1 is at the proper stage, viz., the buds are

sufficiently opened to see the backs of the petals. No. 2 is a peach twig in winter with the bud scales securely closed against the intrusion of liquids, and the microscopic spores may certainly be hidden therein. Fig. 3 shows apple buds ready for spraying, and fig. 4 the closed buds of midwinter, figs. 5 and 6 are apricots at suitable and unsuitable stages for spraying, figs. 7 and 8 show pears in similar conditions. Professor Bailey advocates spraying the apples when the cluster of flower buds have completely cast away all coverings, and I have personally seen a large area of apricots sprayed with strong Bordeaux mixture when the trees were pink with expanded blooms, and yet no injury resulted to the trees or crop.

The second cause of failure, viz., applying the dressing in an improper form or slovenly manner, often results from using old air slaked lime, or in allowing the ingredients of the mixture to remain too long in contact with each other before applying it, thus rendering it less adhesive, as well as permitting certain chemical reactions to take place which should gradually occur when the wash is upon the tree and in contact with the disease. The slovenly dressing which leaves many portions of the tree untouched can only be remedied by more careful work being done in future.

To overcome difficulty No. 3, caused by excessive rainfall, the only suggestion which to me seems feasible is to delay the spraying as late as possible, until a few fine days are assured, and to use saccharine matter such as sugar, molasses, or honey in the mixture to ensure greater adhesion.

Let us now return to what we have learned practically about the matter. The best time of application is when the buds are unfolding. This may be in August or early in September, according to locality.

The Strength of Mixture to Use.

There are many formulas for Bordeaux mixture, and the early experimenters used 6lbs. copper sulphate in 11galls. of water, but actual tests have shown that a much less quantity will destroy the germinating power of most fungi, and is much cheaper.

I consider the 1 in 5 formula very effective. It consists of 5lbs. copper sulphate (bluestone) 5lbs. fresh lime, and in wet localities 5lb. molasses (sugar or honey) to each 25galls. water, for use in the first late winter dressing; and after the foliage has expanded weakened by simply doubling the quantity of water.

The bluestone is dissolved readily by hanging it in a piece of loosely-woven bagging just beneath the surface of the water in a wooden or copper vessel. In about twenty-four hours a large quantity can thus be dissolved. It can also be dissolved by boiling.

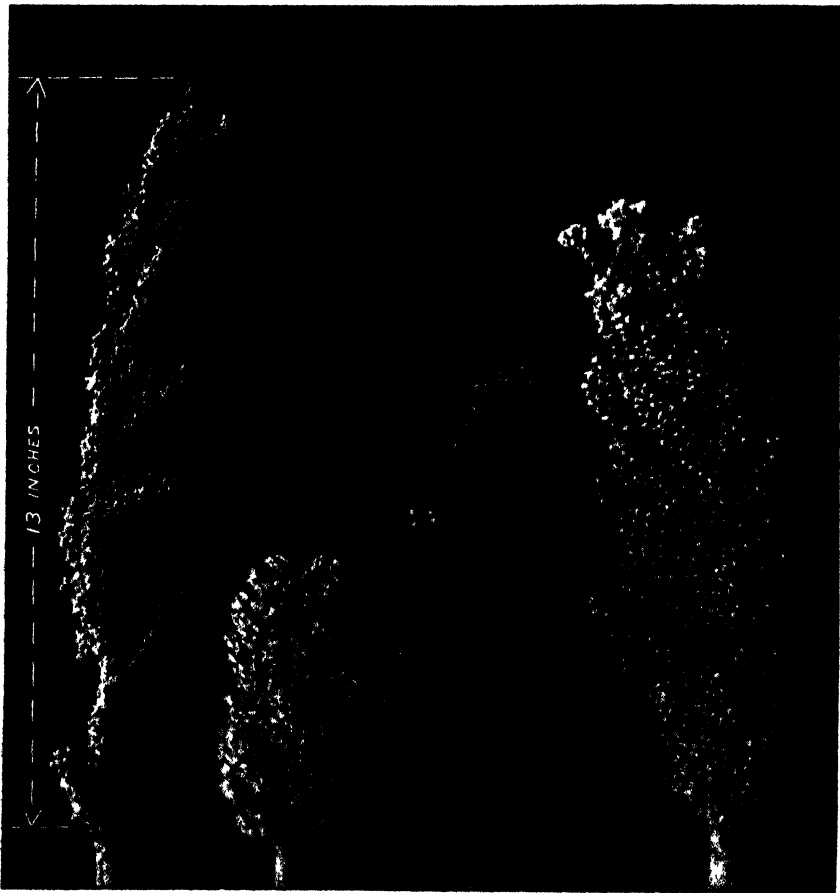
The lime should be quite fresh and lumpy. It should be gradually slaked by the frequent addition of small volumes of water—not by covering it in water. When crumbled to a fine powder, more water can be added to make a thin milk of lime. If anything interferes to prevent the spraying being performed immediately, the two ingredients should be kept separate, but when they are added together the milk of lime should be carefully *strained into the bluestone water*. When beginning to spray a deciduous tree, spray the inside surfaces of the branches first, then work around the outside, and finally complete the trunk down to the ground, taking care that not a particle of surface escapes the drenching spray.

It is not advisable to use too strong a pressure in the air chamber or triple cyclone nozzles; these only waste material. The quantities required vary from 1gall. to 3galls., according to the size of the tree under treatment, and where a 30ft. length of hose is used, and double nozzles, a tree of average size will be sprayed in about three minutes.

The mixture should be applied with a spray pump possessing an automatic agitator.

SORGHUM.

Owing to the very favorable reports as to the drought-resisting nature of Red Kaffir corn, the General Secretary of the Agricultural Bureau obtained a few pounds of seed in October, 1896, and distributed it to a few farmers. In spite of the season and being sown very late, it gave reasonable promise of being a valuable acquisition. In the following year further lots of seed of both the Red and White varieties were obtained and distributed, but owing to the drought they had very little chance of success. From quite a number of experimenters very favorable reports were received as to their hardiness compared with other sorghums, and where there was any moisture at all the plants grew 4ft. to 5ft. in height, were very leafy, and generally produced a fair head of seed. The Kaffir corn is a sport from the old Dhurra, so largely grown in Africa, but has a much larger head of seed.



In the illustration the head of seed on the left is Red Kaffir corn; next is the White Dhurra; then Early Amber cane, the variety of sorghum mostly grown here; and on the outside is White Kaffir corn. The Red Kaffir corn

seems to be the better for dry districts, but with a fair amount of moisture the white variety, as far as the past two years' experience goes, is a quicker grower. Both are very leafy and yield a large amount of feed. Sorghum seed should be sown in drills as soon after frost as possible, and the soil between the rows kept loose. About 4lbs. to 6lbs. of seed per acre will be required, and the rows should be 2ft. 6in. to 3ft. apart. Light soils are best suited for sorghum.

THE VINEYARD.

NOTES AND HINTS FOR AUGUST.

Written for the "Journal of Agriculture and Industry."

By ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The second ploughing should be pushed on vigorously. It need only be given on a comparatively shallow furrow, excepting where weeds render deeper work necessary. If some delay should occur through wet weather or pressure of other work, and large areas have to be ploughed, it is advisable to throw the first two furrows against the vines, leaving the rest of the land to be worked later on. This practice will reduce the loss of buds rubbed off by the teams as they pass by the growing plants.

In most parts of the colony August is probably the most favorable month for planting out cuttings either in the nursery or vineyard. To render their rooting more certain, and more particularly in the case of varieties striking root badly, such as Malbec, &c., it is advisable to pass a rough wood rasp over the portion of the cutting that is to be buried; the wounds in the bark considerably hasten the outcoming of the callus and roots.

Towards the latter end of the month grafting might be started with advantage.

FARM HINTS FOR AUGUST.

By THE EDITOR.

The past month has given Professor W. Lowrie, M.A., B.Sc., Principal of Roseworthy Agricultural College, so much to look after on the farm that he has been unable to write up his usual greatly-appreciated "Notes"; and this gives me an opportunity to direct attention to an injustice done to the *Journal of Agriculture and Industry*, as well as to the various specialists who write for it. Several otherwise respectably-conducted newspapers are in the constant habit of copying articles specially written for this journal, leaving only the author's name at the head, after striking out the words in some of them—"Written for the *Journal of Agriculture and Industry* by —," thus leading readers to infer that the Professors of Agriculture and Viticulture, the Inspector of Fruit, and other specialists are engaged upon their own literary staffs. There is no desire whatever to restrict the republication of every article in this journal, but it is only honest and right to state the source from which they are derived.

Wherever the crops are "winter proud" it will be desirable to feed them down a little with sheep as early as possible. Where the soil has caked down a light harrowing will be beneficial. If the plant is thin and spindly, roll first when the soil is mellow and rather dry, and harrow soon after.

Feed lambs and young rams liberally, and do not hurry to shear them. There will probably be frost till end of September, and this will be prejudicial.

Ewes that have had their lambs taken away should be kept upon rather short diet in order to check milk production.

Whether cows are kept or not, there should be ample provision of ensilage. Horses, sheep, and pigs will be all the better in health and condition during autumn and early winter if fed with some ensiled green fodder. The greater the mixture of edible nutritious plants, the better the silage. Silos are best in the long run, but if no ensilage pits are ready it will be better to make stack silage than to have none at all. Any kind of leguminous plants mixed with cereal plants will greatly improve the fodder. Where dairy cows are kept, ensiled fodder should certainly be regarded as an essential.

In the south, south-east, and hilly districts it may not be too late to sow oats and barley, but time is very short for this purpose.

Sow peas upon as large an area as can properly be got under cultivation. They renovate the soil to considerable extent, and the whole crop is valuable for pigs and other farm live stock. Sow thinly in drills 2ft. apart.

White mustard grows quickly, and if sown now will mature in eight to ten weeks. For seed sow 2lbs. in drills 2ft. apart, thinly; for fodder sow 3lbs. to 5lbs. broadcast per acre.

Pumpkins and pie melons should not be sown till all danger of frost is past, say October 1. Prepare land now by putting plenty very old manure on the land, and work it well into the soil.

Prepare land at once for maize, millets, sorghums, holcus, mangolds, beets, and other summer crops. Work in old manure, and break up the soil to a fine tilth.

Mangolds and beets should be sown from now till end of November, in drills 2ft. apart. Thin out and single the plants to 1ft. apart in the lines, and keep the surface continuously loose to a depth of 2in., not more. The same treatment should be given to maize, sorghum, &c. Pigs, as well as cows, horses, and sheep, thrive upon these crops.

Sow summer rape upon enriched soil that has been deeply ploughed and worked down to a fine tilth. It is a good precursor to a cereal crop.

Pen up pigs intended for slaughter, and cease altogether giving them green feed.

Sow carrots and parsnips in drills 18in. apart, and thin out the plants to 9in. apart. The soil should be deep, mellow, and not too dry. Use nothing but very old manure if the soil is poor.

This is the best time to employ the entire horse. Be sure that the animal is sound, without vices, and of the right character for the purpose. A guinea or two "saved" on the service may cause a loss of several guineas in the value of the foal. It is not always the best horse that takes the most prizes at the petty agricultural shows.

Prepare land for lucern by ploughing deeply, then harrow fine and roll and level the ground. The soil should be as fine as for onions; it should be deep, loamy, friable, and not too dry. Sow seed in drills when night frosts are over a foot apart with 10lbs. seed per acre. Get colonial-grown seed if possible.

"Bare fallow" is a mockery and a delusion. Take diverse crops off the land, and compensate by putting on suitable fertilisers. Surely the experience gained in all other countries ought to apply here. One kind of crop cleans and prepares the land for another kind; but every crop removes something from the soil that must be restored for other crops.

Weeds are the chief cause of deficient crops. A weed is only a plant out of place. Clean fields give clean and heavy crops. Every effort should be made during the next two months to pull up and carry off the field all charcoal docks, thistles, and other weeds infesting the crops.

Lambs should be converted into wethers when fifteen days old. Cut the scrotum across, and then remove the testes by drawing, close the skin over the wound, and turn the lamb to run with the others.

Sunflowers should be sown now in lines 4ft. apart, with 2ft. between the plants. "Maw" is the Indian name for white poppy seed, which is largely used for human food as well as for birds. It is grown over immense areas for oil producing, and should be sown now for transplanting in rows 24in. x 18in. apart. The opium poppy may also be sown and planted in same way.

Tares and lentils may be sown now in drills, on soil suitable for peas. Lentils are very nourishing, and make the best possible food for dyspeptics.

Tobacco may still be sown in nursery beds for planting out when frost is no longer to be feared.

Plant potatoes in frost-free localities. Plough deeply, pulverise thoroughly, and use plenty of thoroughly old manure.

Chicory should be planted in deep rich soil, not too dry. This crop will not pay to grow except for local demand. Values run from £3 10s. to £4 per ton.

COMMON-SENSE PIG-FARMING.

It does not pay to breed unthrifty animals which eat much, make little growth, and take a long time about it. Such animals are the progeny of a boar with no "breed" in its constitution, allied to a sow, probably, which ought to have been killed when five months old. Even the best-bred sow, however, will produce inferior stock when mated with a mongrel boar; but a coarse, long-bodied, deep-bodied sow will throw good pigs if the boar is pure bred. Select the best sows all the time for breeding, whether pure or "grade" breed, but never use any but a thoroughbred boar.

Separator milk is much more valuable than whey for feeding pigs or any other animal. If judiciously mixed with meal, or crushed grain or peas, it will force pigs ahead rapidly. Green feed should not be given at all during the time the pigs are being fattened for killing; but young and growing pigs should have as much green feed as they can eat. Allow them if possible to graze upon lucern, clover, or any growing feed. Do not give much grain to breeding sows, as this makes them too fat.

Young pigs should be weaned when nine weeks old, and should be fed six times a day for ten days after, giving a little each time. After ten days feed them four times a day, and at end of another week three times a day will be enough, if they have at each feed just as much as they will eat, *and no more*.

A pig, properly fed and well housed, should weigh 150lbs. to 160lbs. when six months old. The best weight for sale to butchers is 60lbs. to 80lbs.; for bacon, 100lbs. to 160lbs. A carcass weighing 150lbs. will give about 100lbs. cured bacon.

Young pigs do not thrive during cold, wet weather; and it is desirable to have them littered about September till March. The earlier pigs can be turned on to the fields and stubbles. Pea stubbles especially make suitable foraging ground for pigs.

Nothing tends more to profitable pig farming than clean, commodious, warm sties, well provided with litter as bedding. The manure from the pigsties will pay for the cleaning up work.

It will always pay well to grow peas and beans for pigs. The crops need not be thrashed out for young animals that are not being fattened up. Stack the crop near the sties, and feed straw and pulse together. The pigs will gain cheerful exercise in grubbing amongst the haulms for the seed, and will eat a lot of the refuse with the rest. On the fields the cultivation of legumes will enrich the soil with nitrogen—the most expensive item in fertilisers—and the pigs will gather up the loose seeds, whilst at the same time benefiting the land.

WEATHER AND CROP REPORTS.

ANGAS PLAINS.—Rainfall for July, 0·53in., the driest July for many years. Owing to frost crops and feed make but slow progress.

ANGASTON.—Splendid showers of rain have been experienced, also sharp frosts. Stock are in splendid condition.

APPILA-YARROWIE.—Rainfall for three weeks, over 4in. Several severe frosts have been experienced, but with the nice showers we have had the wheat and feed is growing well.

ARDEN VALE.—The wheat is making fair progress, and does not seem to be retarded by frosts (which have been rather prevalent) to the same extent as the grass. Rainfall for five months ending May 31, about 2in.; for June, 6in. to 7½in.

ASHBOURNE.—Four inches of rain since last report. July has been generally fine and dry, with sharp frosts, which have retarded vegetation. Stock looking fairly well.

BALAKLAVA.—Early part of month was dry and some very sharp frosts were experienced, keeping back the feed and crops. From 1in. to 1½in. of rain has since fallen. Almond trees in early blossom this season.

BORDERTOWN.—Seeding is about finished, a larger area having been put in than for years past. The seed and manure drill has been largely used. The weather lately has been wet and squally, and water is seen in all directions. The grass is growing fast, and everything points to a good season.

BRINKWORTH.—The past few weeks have been dry and cold, the crops and feed making slow progress, but rain has again commenced. Rainfall for July, about 1in.

CALLINGTON.—Splendid fall of rain experienced on July 22. Late-sown wheat is somewhat backward. Crops in Bremer district are not so forward as the crops round Murray Bridge and Mobilong. The prospects of the hay crop are good.

CHERRY GARDENS.—The weather has been all that could be desired; crops are doing well, stock are in good condition, and there is every prospect of a good season. Rainfall for past month, about 5in.

GAWLER RIVER.—The early part of July was cold and dry, making the land hard for fallowing, and affecting the growth of grass where it was at all dense. Frosts have had an injurious effect on the late-sown oat crops. The influence of the manure is showing more and more every day. Fallowing is being pushed on; stock in good condition; garden produce doing well.

INKERMAN.—The early part of month was cold, dry, and frosty, but we have since had nice soaking rains. The early wheat looks well; in fact, the crops look better than they have done for years at this season of the year. Rainfall since previous report, 0·89in.

KARUNDA.—Rainfall for six months ending June 30, 8·99in., more than double last year's fall to same date. Crops are looking well, but the grass is not so good as it was. Sharp frosts have been experienced.

LUCINDALE.—Generally a wet, rough month. Rainfall, 3·75in. The past week's rain likely to harm the crops on the lower lands. Stock doing well and feed plentiful.

LYNDCH.—Since previous report we have had a spell of dry frosty weather, but no particular damage has been done. Splendid rains have again been experienced; feed is plentiful, and stock in good condition.

MAITLAND.—The season continues to promise well, nice rains falling at short intervals. Feed is plentiful and lambing is good. Rainfall for year to date, over 13·00in., and everyone is satisfied with the growth of the crops.

MEADOWS.—Wintry, boisterous weather has been experienced, with sharp frost and intense cold. Frosts and feed have been making little progress. Stock are in good condition. Seeding is finished.

MILLICENT.—We have had plenty of rain during month, the showers being well distributed; consequently the land has not been flooded. About 2in of rain since previous report. Crops are growing well, though some portions, sown broadcast with super, have had to be resown. Some early potato crops are up and looking well, and vegetables coming on. Drains and waterholes are low for this time of the year.

MINLATON.—Splendid season so far, rain generally coming when of most use. Rainfall to date, 10·33in., about double last year's record to same date. Crops are growing well, though great damage has been done by grubs. Self-sown crops on manured land look remarkably well. Stock improving. Farmers fallowing.

MOUNT GAMBIER.—The rainfall to date is much below the average, but the crops are doing as well as can be desired. Owing to dryness in early part of month some light lands began to drift, but rain has since fallen. Probably owing to warmth of the soil, and the rain not being so copious, vegetation has generally made more progress than usual at this time of the year. Stock in good condition; but there is a prospect of short milk supply owing to so many of the cows not coming in this season.

MOUNT REMARKABLE.—Crops and herbage are at a standstill owing to cold rough weather and absence of rain. Frosts have been very severe.

MURRAY BRIDGE.—The weather has been somewhat dry, with occasional light showers. Crops and feed make good progress, and the season promises well. Lambing is about finished, and stock are improving in condition.

NANTAWARRA.—Cold, dry weather was experienced early in the month, but nice rains have again fallen. Stock are doing well, and crops are coming on nicely, especially those put in with the drill.

NARRIDY.—So far the season has been all that could be desired; the wheat crops are looking well and are free from oats. In some cases they are too forward, some being about 2ft. high. Feed is becoming plentiful, and stock are improving in condition.

PORT GERMEIN.—The weather during past six weeks has been very favorable, and the crops are healthy and growing fast. Some farmers are now cutting green feed.

PORT LINCOLN.—Splendid rains since previous report. Seeding is finished, and the early-sown crops are looking well. The prospects of the season generally are good, lambing and wool clip included. Stock are improving in condition.

PYAP.—Crops are coming on well, and are more advanced than usual. Stock are doing well, though feed is not yet plentiful. The month has been rather dry, with sharp frosts.

SADDLEWORTH.—The seeding delayed by rain during May has only just been finished, the ground being too wet and sticky to be worked; fallowing too is backward. Stock in fair condition; feed short, but prospects are favorable for a good season. The sharp frosts of a few days ago are being followed by steady rains. Rainfall for July, to 21st, 1·51in.

STOCKPORT.—The weather has been rather dry, with a good deal of frost. Crops and feed have not made much headway during the month.

STRATHALBYN.—Several severe frosts have kept back crops and feed, and destroyed the early potatoes. The crops are generally looking well. Rainfall for July, about 1in.

SWAN REACH.—So far the crops look well. The soil is sufficiently moist to keep them growing nicely.

WOODSIDE.—Fine weather and cold nights experienced since previous report. The grass and crops are coming on well, and a good lambing is being experienced. The milk supply is steadily increasing.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

July 30th, 1898.

During the earlier half of July fine growing conditions prevailed, which, following the heavy rains of June, brought along vegetation nicely, excepting in a few odd places where night frosts for a time retarded growth. The past fortnight has given an alternation of sunshine and shower, and prospects throughout the agricultural districts are very bright, although it is never safe to reckon the harvest before the grain has been bagged, as the outlook during many a favorable winter has been marred by a dry unfavorable spring. The conditions this season up till now are all that could be desired. Feed is becoming abundant, and the young wheat plant everywhere stooling out well.

Improving tone of business in the country continues, but no great activity can be expected until prospects become still further assured. In the city trade is fair for time of year.

The probability of an exceptionally good harvest in the northern hemisphere—a few districts in Russia and the state of California excepted—points to the likelihood of lower prices than were calculated upon a month or two ago. As the wheat stocks of the world, however, had been unusually depleted at high prices holders may be expected to exercise an influence in preventing a "slump." In Australia the breadstuffs market at the moment is in a rather peculiar condition. American flour is being offered cheaply in the eastern colonies, but as New South Wales has still a surplus she is getting rid of it mostly in Queensland, whilst Victoria is moving off her small exportable balance generally in the direction of Western Australia. In South Australia there is no shipping business doing, a very narrow margin of stocks not rendering necessary any push to clear.

Although our market has been influenced from 2d. to 3d. per bushel by intercolonial movements, the Millers' Association quotations for flour remain unchanged, but may be considered only nominal, as outside brands are obtainable much lower. Bran and pollard have further eased and are, for the first time during many months past, about on a par with Melbourne and Sydney prices. In forage and feeding grains there is very little business doing, and values in these have also receded.

During the month potatoes have fluctuated somewhat, but on the whole prices have eased down from the extreme rates which obtained previously, whilst speculators were so excitedly operating. For supplies South Australia is dependent almost entirely upon importations, but the high value compared with that of flour has caused a marked decrease in consumption of potatoes. Onions are also dear, and quantities being handled are lighter than usual at this time of year.

In dairy produce lines a full month's business has resulted. Butter has steadily increased in supply from local sources, so that importations have stopped; but, notwithstanding the plenteousness of feed and genial weather, there is not yet any surplus available. Consumption is greater than usual for time of year, influenced no doubt by the reaction after the long period of high prices. Values eased off about 4d. soon after last reporting, but have remained steady for the past two weeks. The fall in price of eggs that we looked for has been very fully accentuated, but values have apparently settled for the present, and at the lower rates export demand is sufficiently brisk to readily absorb all coming forward. This market is now dependent upon importations for quite half its cheese requirements, and must continue so for a month or two. Trade in bacon is more active, and although present quotations do not show any improvement an early advance may be expected, as curers are again forced to import a portion of their supplies of the live material. Under the influence of cheapening in butter demand for honey has slackened off, price going back about 3d. Almonds remain in fair request. Beeswax scarce

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, dull at 3s. 6d. to 3s. 8d. per bushel 60lbs.
 Flour.—City brands, £11; country quoted, £9 17s. 6d. to £10 10s. per ton 2,000lbs.
 Bran.—7½d.; pollard, 8½d. per bushel of 20lbs.
 Oats.—Local Algerian, 2s., stout white, to 3s.; imported, nominal, 3s. 4d. to 3s. 6d. per bushel of 40lbs.
 Barley.—Malting, 4s. 6d. to 5s.; feeding sorts, 2s. 6d. to 2s. 9d. per bushel of 50lbs.
 Malt.—Local, 8s. 6d. to 9s. 6d. per bushel of 40lbs.
 Chaff.—£2 12s. 6d. to £3 per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—Mount Gambiers, £9 to £9 5s.; Tasmanians, £9 15s. to £10 5s.; New Zealand's, £9 10s. to £9 15s. per 2,240lbs.
 Onions.—£11 to £11 10s. per 2,240lbs.
 Butter.—Creamery and factory prints, 1s. 1½d. to 1s. 3d.; dairy and collectors' lines, 11d. to 1s. 1d. per lb.
 Cheese.—S.A. Factory, large to loaf, 9d. to 10d. per lb.
 Bacon.—Factory, cured sides, 8d. to 8½d.; farm lots, 7d. to 7½d. per lb.
 Hams.—S.A. Factory, 6½d. to 9d. per lb.
 Eggs.—Louse, 10½d.; in casks, f.o.b., 1s. per doz.
 Lard.—In bladders, 7d.; tins, 6d. per lb.
 Honey.—3½d. to 4d. for best extracted, in 60lb. tins; beeswax, 1s. 1d. per lb.
 Almonds.—Soft shells, 3½d.; kernels, 8½d. to 9d. per lb.
 Gum.—Best clear wattle, 2½d. per lb.
 Carcass Meat.—Fair to good shop porkers, 5½d. to 6½d. per lb.; baconers, 5d. to 5½d.
 Poultry.—Medium to good hens, 1s. 3d. to 1s. 8d. each; roosters, 1s. 5d. to 2s. 4d.; ducks, 2s. 9d. to 3s. 6d.; geese, 3s. 6d. to 4s. 6d.; pigeons, 7d. to 8d.; turkeys, 5d. to 6½d. per lb., live weight, for medium to fair birds.

SHEEPSKINS.—A properly cured sheepskin is worth two that have been carelessly treated. Directly the skin has been taken off, hang it lengthwise across a rail, flesh side up, in a shady place, and pull it out to make it square; cut off the trotters. When the skin is quite dry paint the flesh side with a solution made as follows:—Mix 5lb. arsenic and 6lb. soda in 10galls. of water. Boil slowly for about half an hour, and when the mixture rises, dilute with twice the quantity of cold water. Apply with a brush. This arsenical preparation has a drying effect, and is the same as that used as a preventive of weevils. For the latter purpose a little bitter aloes should be added; it renders the skin very distasteful to weevils or other insects.

AUTO-CURE BACON.—In Sweden and in Dorsetshire (England), at the factory of Oake, Woods, & Co., at Gillingham, a new process under the above name has recently been adopted. About seven hours only is required to cure meat, which retains its albumen in an almost unchanged condition, so that the meat is tender, mild, and sweet. The process is carried on in air-tight cylinders of considerable capacity. The meat is placed in the cylinders after a preliminary treatment and a vacuum created, which causes all air and gases to escape, and the meat is then impregnated with brine under considerable pressure. The cost of apparatus to treat 150 sides at a time is said to be £780 in Britain.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, JULY 20.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Messrs Samuel Goode, W. C. Grasby, H. Kelly, J. Miller, T. Price, and A. Molineux (Secretary).

Congress.

The SECRETARY reported having received a number of papers for Congress, also suggestions for subjects for consideration, and as early as possible the agenda would be arranged. The meetings would be held on September 7, 8, and 9.

Analyses of Manures.

The SECRETARY stated that the analyst of the School of Mines had declined to analyse samples of manures for members of the Bureau for 3s. for each determination required, unless accompanied by invoice and guarantee of the seller. As the analyses were generally wanted for experimental purposes, and often of mixtures made by the members, the decision of the analyst had prevented the members having fertilisers analysed. At his request the Minister had brought the matter before the Council of the School of Mines, with the result that the Council agreed to make analyses for members of the Bureau at the rate of 3s. for each determination required, provided the samples were accompanied by a certificate from the Secretary that the analyses were not required for commercial purposes. It would, therefore, be necessary for any member desiring to have fertilisers analysed to send the same to the Bureau office, with necessary fees and statement as to where obtained and for what the analysis is desired.

Osier Cultivation.

Some discussion ensued on the cultivation of osiers, and the opinion was expressed that it would pay to grow them along the banks of the drains in the South-East, as not only would there be some revenue from the osiers, but they would protect the banks from injury. It was also considered that if osiers were grown in the locality and manufactured into baskets for carrying potatoes, the producers and the consumers of potatoes would benefit, as there was a heavy loss under the present system of marketing in bags.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical papers:—

225. *Milling Qualities of Wheat*, published by Messrs. F. B. Guthrie and E. H. Gurney, through the Department of Agriculture of New South Wales. They used one of Ganz and Co.'s "toy mills." The difference between the results gained by this mill and millers' flour, as regards dry gluten, was in one case 8.18 by toy mill to 8.21 by millers' results, in another as 8.87 to 8.81, and, as regards strength, 49.5 to 50., and in another case none at all. The chief difference, which, however, does not affect the nature of the flour, was in the color, 1° less out of 21° than the most favored tint by the millers. It had a faint tinge of grey from the retention of the germ at the toy mill. To determine the gluten contents of the flour, which is our chief guide to its nutritive value, 10 grammes (3oz.) of flour are weighed and made into a stiff dough with water. After standing for one hour it is kneaded by the fingers in a glass vessel, with water, until all the starch is removed and the water is clear, or more accurately, when a drop of iodine ceases to strike a blue color. After being freed as much as

possible from moisture the gluten is weighed, but still called "wet" gluten. It is next washed slightly with ether to remove the fat, and dried for six hours at 100° C. Again it is weighed, and the number obtained to 100 parts gives us the "dry gluten," which differs greatly in appearance. It is white, yellow, or dirty grey, sometimes sticky, others are hard and non-adhesive, but all contain about 16° nitrogen. The "strength" is the quantity of water which a flour will absorb to make a dough of a certain consistency, upon which depends the quantity of loaves obtainable from it, as well as the rising power of the dough to make a good loaf. Of seventy-five varieties of wheat the following gave a very good loaf, viz.:—Bancroft, giving the biggest volume, 75.2 per cent. of flour, but is difficult to mill; next Hudson's Early Purple Straw, 73.7 per cent. of flour, and easy to mill; Gallician Summer Wheat, 78.4 per cent. of flour (the highest of all), and fair to mill. All the following are alike as to volume of loaf—Amethyst, 73 per cent. of flour, and Pringle's No. 5, 74.8 per cent. of flour, both fair to mill; Toby, 72.2 per cent. of flour, and White Naples, 73.4 per cent., are both easy to mill. The flour from the hard grain separates more easily from the bran than from soft wheat, and the percentage of bran is therefore less, while the percentage of gluten in the flour from hard wheats is greater, the bulk of the gluten being near the bran. The soft wheats usually yield the most bulky flour, while that from the hard wheats is of smaller bulk, but exceedingly heavy. The bread from fine flour is more nutritious than from coarse flour, and that containing most gluten more so than where there is a smaller quantity. A slight alteration in the milling will, of course, alter the quantities of flour, pollard, and bran obtained from any wheat, and by sacrificing some of the flour percentage you can easily improve the color. A flour which has but a very slight yellow tinge produces the whitest bread, but it is generally deficient in gluten and in strength, as are those of the type represented by Purple Straw and Defiance. The Tuscan group gives a decided yellow tinge and more gluten, and the percentage increases with the yellow color through the Fife and Indian groups until excessive in the Durums. The flour of the Durums is only of medium strength. Some years ago, I understand that a contract for flour containing 9 per cent. of gluten for New Caledonia could not be taken, as our soft wheats did not give quite as much, and other wheats were hardly cultivated. And yet, as a rule, these soft wheats are more liable to disease. Cross-breeding has of course been carried on, and many new varieties stand midway between the parents as regards color, strength, and gluten. One matter of importance is that, if wheat is harvested after rain, it not only loses weight, but it possesses the milling qualities of a soft wheat; the color is not so good, but whether it loses gluten and strength is not yet ascertained. One of the best all-round wheats is Blount's Lambrigg. It is easy to mill, gives a high percentage of flour (over 80 per cent.) of good color, contents of gluten and also strength, but cut after rain it produced only 73 per cent. of flour. Whether the excellent flour does really not make such good bread, as some say, is perhaps on account of its unusual strength. Of wheats grown in South Australia, Mr. Guthrie thinks the Nonpareil to be very good as regards milling weight, color of flour, and 14.12 gluten. Ward's Prolific, grown at Port Pirie, gave in one case 71.5 per cent. of flour, in another 73.7, and the average of gluten was 12.70.

226. *New Kinds of Potatoes*.—At the Experimental Station of Kappeln, near Schleswig, six newly raised kinds were tried and compared with the potato usually cultivated in that neighborhood, and numbered 6. The sort lately raised from seed near Kappeln proved to be of no value; but the crop from the other five raised by Mr. Cimbal, in Silesia, was without exception very much better than that from the potatoes usually grown near Kappeln, and the latter suffered as well at the station as all around much from potato rot. The percentage of starch was also larger; in two more than 4 per cent. larger. The potatoes were twice sprayed with Bordeaux mixture. Ceres gave 18½ tons against 2½ tons per acre from No. 6. The following remarks are added to the report:—1. That the cut potatoes appeared to suffer more from the disease, and gave not quite so good a crop. 2. That the potato which had been long in cultivation was less able to withstand disease, being not so vigorous. The crop was also not so good as regards taste, quantity of tubers, and their starch less. 3. Potatoes lately raised from seed do not require so good a soil or so much manure. 4. Too small, and especially unripe potatoes should never be expected to give even a fair crop. I may here also remark that if potatoes are exposed only for a few hours to the sunlight their flavor is destroyed, and yet how many neglect this, and bring to market tubers that have lost much of their value.

227. *Potash Works in Stassfurt*.—From the annual report for 1897, I observe that for manuring purposes the following quantities of potash salts had been sold, viz., muriate of potash, 1,241,548 cwt. of 80 per cent.; sulphate of potash, 263,402 cwt. (of 90 per cent., of which no less than 8,508 cwt. had been used in the Sandwich Islands); kainit sylvinite, 19,282,102 cwt. (of which Australia took 10,464 cwt. more than in 1896); carnallite and bergkieserite, 1,274,022 cwt. Smaller quantities of other salts.

228. *Fowl Dung*.—Dr. Ulrich, of Munich, in reminding us that the old Romans collected the excrements from pigeons—especially in Columbaria—to be used in gardens for the best fruits, calls attention in per centum to the value of the dung of pigeons, fowls, ducks, and

geese. In his table the higher or lower value is of course determined by the kind of food the birds have been consuming:—

	Pigeons.	Fowls.	Ducks.	Geese
Organic Matter.....	31-32	21-26	40	14
Nitrogen	1-2-2-4	0-7-1-9	0-8	0-6
Phosphates	3-4-2	5	3-5	0-9
Alkaline Salts	3-2-2	1-2-1-6	0-4	3-1
Ashes.....	9-14	9-14	7	4
Water	62	65	53	82

Pigeons prefer leguminous seeds or grain, and if fed thereon their dung is even much richer in nitrogen than sheepdung. Fowls' dung contains, of course, considerably more nitrogen if the birds are chiefly fed on grain, and not merely on grass or greens. All the plant food in these manures is in an easily soluble and concentrated condition, and they must not be used except with caution, or the plants might be burned out, especially in very dry soil, or, if dissolved, used in dry weather. Cabbages, cauliflowers, and turnips, &c., are much benefited by the use of pigeon or fowl dung.

229. *Wheat from Argentina.*—After three bad crops through locusts and dry seasons it is probable that, according to reports from there to the end of January, wheat and flour to an amount of not less than £8,000,000 to £9,000,000 will be exported.

230. *Value of the Trade in Poultry and Eggs.*—Although the breeding of poultry has of late years made great strides in Germany, the importation of eggs is still enormous, even proportionately greater than to England. In the last six months 1,250 million eggs, of the value of £2,618,400, were imported, or about twenty-three eggs per head of the population, and at present the value stands next to the importation of wheat, and before all other agricultural produce. In the United States the value of eggs produced in 1896 was 165 million dollars, and poultry was sold in the markets for 125 million dollars. The total is therefore of greater value than the whole of the wheat harvest, and also that of cotton, by 31 million dollars.

231. *An Enemy of Phylloxera.*—Mons. Dubois has reported to the Academy of Sciences, at Paris, that he has found a micro-organism which kills phylloxera and various mites. The bodies of the insects so killed contained when inspected a great many bacteria; but the poisonous qualities of the organisms seem to differ according to the nature of the soil and the weather. Dubois placed two roots of vines containing phylloxera upon blotting paper, and sowed bacteria on to them. Eight other roots he put into vessels filled with earth, and sowed bacteria on these also. After two days all the phylloxera were dead on the two roots on the blotting paper; after five days on the eight roots; while those two roots which had not received any bacteria had plenty of living phylloxera on them. Others could also detect bacteria within the bodies of the dead phylloxera in some instances.

Combined Branch Shows.

The Hon. Sec. Port Broughton Branch wrote that the combined show in connection with the Mundoorra, Pine Forest, and Port Broughton Branches was to be held on Wednesday, September 21, at Port Broughton.

The Hon. Sec. Bowhill Branch wrote that it had been decided to hold a united show in connection with the River Murray Branches of the Bureau at Chucka Bend, on Thursday, September 29. The Branches taking part are the Bowhill, Forster, Lyrup, and Swan Reach Branches, and the show is to be mainly of the products of the River Murray districts, and implements suitable for this part of the colony. Members of the Central Bureau were invited to be present.

The Secretary of the Northern Yorke's Peninsula Field Trial Society wrote inviting members to attend field trial of cultivating implements at Rute, on August 3.

Fertilisers.

The Hon. Sec. Gladstone Branch forwarded resolution urging that in view of the growing demand for fertilisers no leases should in future be granted for any guano or mineral manure deposits, but that licences should be issued to those who require the manure, and are unable to purchase owing to high prices.

The SECRETARY said he did not see how it was possible to carry out such a suggestion. How were the individual farmers to go to Kangaroo Island or to the islands on the west coast and get the manure they wanted, or how would they be able to work mineral deposits?

Several members agreed with the Sec., but Mr. Miller said the same question was cropping up at Port Broughton, where there was a large deposit of oyster shells, and one man had applied for a lease of the whole foreshore. This was naturally objected to by the residents. The shells were taken to Hahndorf and there manufactured into "superphosphate"! Members pointed out that there was no phosphate worth speaking of in the shells, and to sell them after treatment as super was a deliberate fraud. The shells, if burnt, would be of value on heavy clay soils, or even unburnt would improve the mechanical condition of such soil.

The CHAIRMAN said he had received a letter from Renmark Branch stating that large deposits of gypsum had been found near there, and used with advantage on alkali soils.

Mr. MILLER said he understood at previous meeting it was stated that gypsum had no value as a fertiliser. Members said this was correct. The value of gypsum lay in its action on the fertilising constituents already in the soil, in correcting alkalinity in the soil, and in fixing or preventing the loss of ammonia in farm yard manures, &c.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Bute, Mr. W. A. Hamdorf; Stansbury, Messrs. P. Cornish and F. Brook; Lyrup, Mr. R. W. Skelton; Gumeracha, Messrs. J. Monfries and S. Gent; Kapunda, Messrs. J. H. Pascoe and J. O'Dea; Mount Pleasant, Mr. A. Baker; Mount Compass, Mr. S. Lawrence; Stockport, Mr. Jorgensen; Port Elliot, Mr. J. Davidson; Mount Remarkable, Messrs. T. White, C. Blieschke, and H. Humphris; Robertstown, Mr. J. E. Milde; Forster, Mr. A. Retallack; Golden Grove, Mr. H. Bowey; Brinkworth, Mr. C. Horne; Bowhill, Messrs. Smith, Brown, and Gibson; Amyton, Messrs. James Gray and James Burley; Watervale, Mr. Leo Buring; Tanunda, Messrs. T. Ellis and J. C. Jacob; Orroroo, Mr. H. C. Ives; Naracoorte, Messrs. G. Greenham, E. C. Bates, and A. Johnstone; Redhill, Mr. H. Torr; Arden Vale, Messrs. G. H. Williss and G. Miller.

Reports by Branches.

The SECRETARY reported receipt since previous meeting of 104 reports of Branch meetings.

REPORTS BY BRANCHES.

Woodside, June 27.

Present—Messrs. R. W. Kleinschmidt (in chair), J. H. Snell, John Hutchens, N. Schroeder, A. Pfeiffer, A. S. Hughes, F. Heidrich, R. P. Keddie, and C. W. Fowler, and two visitors.

FARMING.—Mr. J. Caldwell read a paper prepared by Mr. R. Caldwell on "The Prospects of the Agriculturist in the Central and Southern Districts of South Australia," of which the following is a short abstract:—

Quoting King Solomon's aphorism that "He that observeth the wind shall not sow, and he that regardeth the clouds shall not reap," the essayist observed that the practical man has but little time to observe natural phenomena, or to formulate theories. This necessary work must be principally left to others, especially mariners. The gist of Solomon's teaching seemed to be "a man cannot do justice to more than one thing at a time"; or, as Goldsmith puts it, "Those who think must govern those who toil." But in ordinary life there should always be some who regularly take notice of what is being done in different places, with a view to assist those in whose welfare they take a direct interest, and who are unable to do this for themselves. Farmers in the Central and Southern districts are making a living by raising hay, grain, sheep, cattle, milk, eggs, and a few less important items. Within a radius of fifty miles of Adelaide hay has been one of the principal sources of revenue during the last

twelve to fifteen years. Grain, sheep, and cattle have not been remunerative there; and in several districts milk and eggs have only been balancing factors in the farmer's accounts. In the fairly favorable climate of the South and South-East rural industries are a little more varied. Drought and the carrying out of such large works as the Happy Valley Waterworks (where a great number of horses were employed) were responsible for high prices of hay, &c., produced on the excellent soil within the fifty-mile radius from the city. But these conditions cannot continue, and it will be necessary to consider the altered conditions under which cultivators of the soil will have to work. Electric tram cars, motor cars, bicycles, gas and oil engines, and various other mechanical agencies are contributing extensively to the disuse of animal power, and consequently the demand for hay and other fodders must decrease very greatly. It has been said "If goods increase those who use them will also increase"; therefore subsistence will always be possible to the intelligent and energetic, but their working policy must conform to the altered conditions. For instance, less hay and more wheat must be grown. Every bushel of wheat exported at less than 4s. a bushel means a loss to the colony. Where commercial fertilisers are used good, round wheat cannot profitably be sold for less than 4s. per bushel. It is a moot question whether grain or fodder for milk and the raising and fattening of stock will be the more profitable. The London market will be open, probably, to receive all the butter and cheese we can produce, at an average (so far as our experience goes) of 1s. per pound for high-class lots, netting 8½d. to 9d. per pound in South Australia. Probably freights and charges will be reduced, but no bonus can be expected. Allowing 2½galls. of milk for each pound of butter the factory could not pay more than 3d. per gallon, and this would not be a living price for the farmer under existing circumstances. But if some better fodder plants could be introduced, or if high-class commercial fertilisers could be procured at lower prices, there would be a certainty of success in the dairy industry—especially if pig-feeding and poultry-farming were made adjuncts to the business. Poultry-farming promises to be profitable in the near future for export of eggs and birds. South Australia has one of the best of climates for this purpose. When improved methods of dairying are adopted better classes of produce will be turned upon the market, and prices will improve—for inferior stuff tends to sicken the market. Fraud and adulteration are great enemies to the farmer. Scores of thousands of tons of stuff made from tallow and other fats are placed on the market in London and sold or used in place of butter. It is said that if the population of London were to use only pure milk from 20,000 to 30,000 more cows would be required—to say nothing about cream, butter, and cheese. Through the before-mentioned frauds and adulterations the dwellers in the city are injured in health and pocket, and honest country people are often brought to the verge of starvation.

STANDARD WEIGHT FOR CHAFF.—Considerable discussion took place on the question of having a standard weight of 40lbs. for bag of chaff. It was resolved to bring the matter up at Congress and to ask the General Secretary to bring the matter before the Branch Bureaus, with a view to obtaining their co-operation in urging that a legal standard should be fixed. [Will the Branches please discuss this matter at an early date.—GEN. SEC.] Members also thought there should be some distinction made in the sale of "header" chaff and ordinary chaff.

LARGE TURNIPS.—Mr. Hutchens tabled large sample of Redtop turnip, 8in. in diameter and weighing 4½lbs.

Johnsburg, June 18.

Present—F. W. Hombsch (Chairman), J. R. Masters, W. McRitchie, H. Arnold, J. Sparks, L. Chalmers, and T. Johnson (Hon. Sec.).

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the past year ten meetings were held, with an average attendance of nine members. Five papers were read and discussed, and generally the interest in the Bureau well sustained. Notwithstanding the fact that the drought of the past three years has placed the members in somewhat straitened circumstances, necessitating enforced absence from home for months at a time, and caused an almost entire absence of vegetation, he considered that their Branch had attained the object for which it was inaugurated, viz., the dissemination of useful knowledge and the bringing together in closer sympathy and unity the tillers of the soil.

FORESTRY.—The Hon. Sec. was instructed to obtain trees from Forest Department, the season being very favorable for tree-planting.

RAINFALL.—For June, 4.000in.

Mount Remarkable, June 29.

Present—Messrs. H. B. Ewens (Chairman), S. Challenger, A. Mitchell, W. Girdham, W. Lange, G. Yates, C. E. Jorgensen, T. P. Yates, and T. H. Casley (Hon. Sec.).

DISCUSSION.—A conversational discussion took place on several matters, including the use of farmyard manure. It was decided to invite the Professor of Agriculture and the General Secretary to visit the district and give addresses or other subjects of interest to the producers.

BENEFICIAL INSECTS.—Mr. G. Yates tabled specimen of what he believed to be an insect pest. [This is the egg case of a mantis. These should never be destroyed, as the mantis lives principally on flies and other insects.—GEN. SEC.]

Forster, July 4.

Present—Messrs. A. Johns (Chairman), C. Bolt, F. Towill, J. Sears, J. Retallack, W. Johns, C. Topsfield, F. Johns, J. Johns, J. Prosser, S. Sears, W. H. Bennett (Hon. Sec.), and six visitors.

MALLEE-CUTTING.—Mr. Prosser read a paper on cutting mallee shoots. He considered August and September best time to cut mallee shoots or scrub. If the shoots are cut about 3in. away from the stumps they do not grow so quickly again as when split off close to the stump. The cuttings should be left till after harvest and then burnt about the beginning of February.

FALLOWING.—An interesting discussion on this subject took place. Mr. Bolt advocated fallowing in stiff clay or Bay of Biscay land, but not in sandy soil; while Mr. Retallack favored fallowing sandy soil to a depth of 5in. when it is wet. Mr. W. Johns considered this too deep to go, but Mr. Topsfield condemned fallowing at all in such land. Mr. Towill said some sandy fallowed land drifted to depth of 1ft. in places, but still gave 11bush. per acre as against only 4bush. on the stiff land. Mr. A. Johns considered 4in. deep enough to fallow; he had some fallow land that drifted to the depth of 10in., and the sand covered a 4ft. picket fence. Mr. Johns believed 8in. the best width to set the plough.

Belair, July 1.

Present—Messrs. W. J. Bartlett (in chair), H. Halstead, O. Nootnagel, and G. R. Laffer (Hon. Sec.).

BRANCH SHOW.—The Hon. Secretary reported that the combined Branch Show at Cherry Gardens resulted in a slight financial loss.

APPLES.—The Hon. Sec. tabled sample of Rymer apples, which was much admired.

BEE MOTH.—Mr. Nootnagel read the following paper on this subject:—

Some beekeepers consider the bee moth the worst enemy of their bees, which, like almost all disorders and evils, becomes dangerous when allowed to go unchecked. An apiarist who is thoroughly up to his business makes very light of this pest; he simply checks it at the outset. Directly he notices the existence of it in the combs he either, with a knife or some similar instrument, destroys each "grub" that he sees, or places the affected frames in another hive, as explained further on. Where the bee moth or "grub" exists in an apiary it will usually be found in the weakest hives, and when a colony gets so weakened that it cannot cover and protect all its combs the unoccupied empty combs are availed of by the female

moth to deposit her eggs. These eggs develop into caterpillars, but require summer temperature to do so. In cold weather they will live a long time in a dormant state before again being transformed into moths.

The existence of "grubs" in a working hive can be ascertained by carefully removing the frames, one after another, and holding them up to the light, and where a "grub" exists there will be seen a silken gallery right through the centre of the comb. Moth web may often be seen attached from one comb to another, and it is in this latter stage when the combs are close together that the greatest mischief is done.

When colonies are strong not much need be feared from the bee moth. It is only the empty frames in the hives of weak colonies and the surplus frames which, during the winter months are stored away, that are in danger. My practice, when I find that a colony is affected, is to remove all empty combs, substituting sound ones and distributing the affected ones amongst several of the strongest Italian or hybrid colonies. In a single night every "grub" will be eradicated, the cells being pulled down by the bees to get at them, and immediately rebuilt in a surprisingly neat and clean way. I have often put a badly-affected frame—taken from a weak colony—into a strong colony just before sundown, and at sunrise next morning watched the bees carrying out the grubs, and hauling them out as far as possible from the alighting board. With Italian or good hybrid bees it is seldom that a trace of moth will be found in a strong hive; it is only with the black bees that they are so troublesome, for these do not seem to fight their natural enemies so vigorously and successfully as do the yellow bees. I believe that, before the introduction of the Italian bee in one of the Australian colonies, the moth had practically cleared the black bee out of existence.

The repression of the bee moth cannot be dealt with except in the bar frame hive, for in the ordinary box hive, with the combs a fixture, when it once gets in the life of that colony is only a matter of time. The bee moth is of a dirty whitish-brown color, and may often be found between the roof and the mat of the hive. They are very active, and when disturbed flit to and fro very swiftly.

Petersburg, July 2.

Present—Messrs. W. Miller (Chairman), W. Heithersay, D. O'Leary, W. Waters, F. A. Sambell, A. Dowd, H. Earle, James Wilson (Hon. Sec.), and three visitors.

DAIRYING.—Mr. J. M. Cadzow (visitor) read the following paper on "Hints on the Management of a Farm Dairy":—

A serviceable dairy is a necessity on every farm, and can be constructed by any handy man without expending any cash, except perhaps for boards to make a door and some shelving. The excavation should not be less than 4ft. deep and 12ft. wide, and may be 16ft. long. Walls should be built with stone and mortar. One small kiln of lime would be enough. The walls should not be less than 6ft. high, with gables rising at north and south ends 2ft. 6in. higher. Procure one straight piece of timber for the ridge pole, but wallplates are not necessary. The door should be at the south end, with steps ascending from the outside. When the ridge pole is fixed lay on the straightest timber procurable—mallee, sandalwood, or pine (which is best)—side by side as close as possible, with one end resting upon the wall and the other on the ridge pole. Then mix a large bed of pug with as much wheaten chaff or chopped straw as it will hold, leave it a day or two to temper, then plaster enough on the roof to level up between the timber. Let it dry for a day, then put on a coating of the same pug about 3in. thick, and after another day's rest put on a third coat. This roof will keep out heat, cold, and rain, and will last a very long time. Next throw the soil from the excavation up against the walls level with the eaves, and sloping outwards to throw off water. Rough plaster the walls inside and whitewash the roof. The natural floor will be quite good enough. One small window about a foot square should be left in the north end, just below the ridge pole, covered with wire gauze to keep out flies, and a small aperture should be left at the bottom of the door to secure a steady ventilation. A small room should be built above ground at the south end, covering the entrance to the dairy. The door to this should also face south, and a glazed window also facing the same direction. The separator should be kept here, as this will save lugging milk up and down stairs. Experience has shown that such a room is of great use in keeping down the temperature of the dairy. My own dairy is constructed on this plan, but the roof of the upper room is of iron, covered in summer with sheaves of straw, two sheaves deep, which keeps the temperature here very little above that in the dairy below.

*To keep the dairy clean and sweet is a most important matter. Do not make it a general receptacle for broken utensils, lame furniture, and the like, as such articles harbor everything that ought to be kept out. Whitewash the place at least twice a year. Do not spill water or milk upon the floor, but thoroughly sweep it out once a week and liberally sprinkle fresh lime, especially in the corners. If this is done there will be no such thing as ropiness or mould, nor

any kind of creeping insects. Bread, meat, sugar, salt, and similar articles may be kept in such a dairy without tainting the cream or butter; but anything with a pronounced flavor or odor, such as cheese, onions, &c., must be kept out of the dairy.

As regards cream, when two lots of cream are placed in one vessel it should always be stirred at once. This is not always done. When so stirred it ripens evenly, and makes a good quality of butter. Where a lot of cows are kept, ripening cans ought to be provided in the dairy; these should be long and narrow, with the top as wide as the bottom. A stirring device should be used, consisting of a perforated disc on the end of a long tin handle. This should be left in the can, and every time fresh cream is added the stirrer should be pulled up and pushed down once or twice. Such cream should be sent to the factory never more than a week old, but much sooner if possible. Salt or saltpetre should never be added to enhance the keeping qualities of cream, especially during the cold weather. Great care should be taken in adding antiseptics in summer, though a very little may certainly be added.

Where bails are used they should be easy of access to the cows, roofed over, and with provision for escape of urine, &c. If possible provide an iron grating over a small pit under the hinder quarters, and have this cleaned out every day. This liquid manure is very valuable. Where the yard is dirty the cow's teat should be washed with tepid water, and dried with soft cloth to prevent milk being polluted. No amount of care will prevent a little dust and scurf getting into the milk—the milking machine alone will be able to prevent this. This is where the cream separator displays one of its advantages, because all dirt and offensive matter that cannot be strained out is retained at the bottom of the bowl.

To conclude with a word of warning. Very many farmers in the North have lost their best cows through the drought, and will have to breed up from inferior stock. Do not begrudge a little extra expense or time in securing the services of a good bull that may be within a reasonable distance, if not able to have one of your own. This bull should not only be of a good, pure dairy breed, but also come from a good milking family of cows. In Scotland the bull is reckoned to be half the herd—in South Australia this applies with even greater force.

It was decided to ask Mr. R. Cochrane to prepare a paper for Congress on "Diseases of Cattle"; also to ask the Department of Agriculture to loan to the Branch a pure-bred Ayrshire bull, with a view to further improving the breed of the dairy cows of the district. Discussion on paper was adjourned.

AGRICULTURAL SHOW.—It was resolved that the Branch offer special prizes at the agricultural society's show for best collection of vegetables grown in the district, and best plan of farmhouse and outbuildings, the prize plan to become the property of the Branch. Mr. Earle suggested offering a prize or certificate for the best-kept farm in the district, the farms to be judged in three years' time. Some discussion took place, but nothing was done.

OFFICERS.—The Chairman and Secretary furnished annual reports of work of Branch, and were re-elected for ensuing year.

Paskeville, July 2.

Present—Messrs. J. C. Price (Chairman), H. F. Koch, A. Goodall, A. Bussenschutt, J. Bussenschutt, A. Palm, and J. H. Nankervis (Hon. Sec.).

OFFICERS.—Mr. H. F. Koch was elected Chairman, and Mr. J. H. Nankervis re-elected Hon. Sec. for ensuing year. Other formal business was transacted, and members reported extensive use of fertilisers and prospects of good season.

Auburn, June 30.

Present—Messrs. E. M. Dudley (Chairman), W. R. Klau, S. Ford, W. F. Keynes, G. R. Lambert, J. B. Schober, Dr. J. W. Yeatman (Hon. Sec.), and two visitors.

OFFICERS.—Mr. W. R. Klau was elected Chairman, and Dr. Yeatman re-elected Hon. Sec. for ensuing year.

PRUNING VINES.—Mr. Lambert showed diagrams of various methods of pruning vines on the cordon and spalier systems. For Shiraz and Carbinet vines he preferred the Bordelais spalier. If growth became too vigorous and

more wood was required than the two rods trained each way, he would alter it to a cazenave cordon. This might be done with two wires only instead of three by training the main stem along the bottom wire, then bending the rods sharply and fastening them about the middle to the same wire instead of by the last node to the third or lowest wire. A general discussion ensued on pruning vines and fruit trees.

Robertstown, June 29.

Present—Messrs N. Westphalen (Chairman), W. Armstrong, W. Moscy, sen., F. Fielder, A. Rhode, A. Day, T. Hagley, S. Carter (Hon. Sec.), and one visitor.

RAINFALL.—For June 3.340in.

SEED DRILLS AND MANURES.—Mr. Moscy said he was quite satisfied with the work performed by the seed and fertiliser drills. Whether manure was used or not, the system of drilling in the seed was greatly superior to the old methods of broadcasting. He had saved quite twenty bags of seed wheat in the one season through using the drill. The seed sown without manure came up quite thick enough, though the manured crop grew stronger. He could tell to a foot where the manure was not applied. He had used superphosphate and sheep manure; the former clogged in the drill while the latter ran freely. It was of course too early to say which would give best results. Mr. Armstrong said there was no doubt a much greater percentage of the drilled-in seed grew than of the broadcasted. He had seen a manured crop put in three weeks later than one not manured, and the former had overtaken the latter. Mr. Rhode said the drill, by covering the seed at an even depth, prevented loss, but with broadcasting much was never covered at all.

IMPROVING BREED OF DAIRY COWS.—The Chairman initiated a discussion on this subject. He would like to see a vigorous effort made to improve the quality of cows in this district. He noticed the Dairy Instructor advocated crossing the Shorthorn with the Jersey. Mr. Day thought they could do little unless someone would introduce a good bull and a few good cows for breeding purposes. It was suggested that the Branch should obtain a good bull and place it in charge of a reliable person in a central position. A tax on bulls was suggested as the best way of getting rid of the nuisance and injury caused by mongrel bulls. It was finally decided that the Chairman endeavor to secure a bull on loan from the Department of Agriculture.

FODDER PLANTS.—The Secretary was instructed to ask the General Secretary which would be the best fodder plants for this district to withstand drought. [Where the country is dry far more success will be obtained from the conservation and cultivation of our indigenous perennial grasses, saltbushes, and other fodders. Tree lucern should be tried; also lucern, especially where it can be flooded occasionally or watered from wells. Kafir corn and other sorghums should be grown in the summer and used green or preserved as ensilage. In the winter, crops of green feed should be grown, and, with any natural herbage obtainable, preserved either as pit or stack ensilage.—GEN. SEC.]

Dawson, June 25.

Present—Messrs. R. Renton (Chairman), C. W. Dowden, C. H. Meyers, C. Stoneman, F. Schibella, A. F. Dempsey (Hon. Sec.), and one visitor.

SEED DRILL.—The question of purchasing the seed drill which the Branch has had the loan of this season was discussed, but members could come to no decision. The work done by the drill early in the season has not proved satisfactory, in many cases the land having to be re-sown, though the broadcast sowing at same time was all right.

SEASON.—Members reported that the rains had been very general, from 3in. to 4in. being recorded in different parts; the rain being very steady has all soaked in, and the farmers are so hopeful of a good season that a second start has been made to increase the area under crop. The district has been revolutionised by the late rains; and farmers find so much to do, in attending to gardening and other details neglected during past few years of drought, that they are in difficulty as to which to do first. Several are devoting attention to vermin-proof fencing, and in other ways endeavoring to keep the vermin down to the level they have been reduced through the drought.

Port Elliot, June 25.

Present—Messrs. P. O. Hutchinson (in chair), E. Wood, F. F. Fischer, W. E. Hargraves, H. Green, and E. Hill (Hon. Sec.).

EXHIBITS.—Mr. J. O. Whitmore sent samples of Long Red and Sugar beets from Bureau seed; also specimen of Chirk Castle red beet, weighing 13lbs.

CONTROLLING SPREAD OF PESTS.—Mr. Hutchinson read a paper on this subject which he proposed to read at the forthcoming Congress in Adelaide.

SODOM APPLE.—Mr. Green called attention to the ineffectual efforts being made to destroy the plants of *Solanum Sodomæum* by cutting the crown of the crown of the plant. This only made them sprout more, strongly than ever; the plants required uprooting. Methods of dealing with soursops were also discussed.

Forest Range, June 30.

Present—Messrs. J. Vickers (Chairman), S. A. Collins, J. Caldwell, W. Cherryman, J. Sharpe, H. Waters, C. Stafford, H. Caldicott, A. Green, J. G. Rogers, R. M. Hackett (Hon. Sec.), and two visitors.

ONION CULTIVATION.—Mr. Sharpe read a paper on this subject to the following effect:—

Onions, like all other plants, require some study before they can be grown with success. One very important thing is to get the right sort to grow. I prefer a heavy, well-shaped onion, full in the crown and flat at the roots, with a nice dark-brown skin. I do not pretend to pay any attention to the names of the varieties, but simply look out to get a good onion. To get good seed, pick out your seed onions when getting them ready for market, and lay them up until time to plant. I find it better to send the seed to a warmer locality than this for sowing if early onions are wanted, as it is too cold and frosty in the hills. Plants from the seed sown on the Adelaide plains do very well with me. I like to get the plants when about as thick as an ordinary pen handle.

When getting the land ready for planting, plough or dig as roughly as possible, then scatter about 30cwt. to 35cwt. of bonedust per acre on. Do not rake the ground smooth, but leave it rough for three or four weeks, then run the Planet Jr. horsehoe through, repeating again in about a month's time. This will keep the land clean, conserve the moisture, and make the soil friable and in good condition. When the plants are ready to set out, rake the land down as fine as possible; then mark out the lines for planting. I use a piece of wood with six tines, about 10in. or 11in. apart, and drag this over the field. Plant about 3½in. to 4in. apart in the rows. Cut the roots off to about ½in., and the tops to say 6in. Early in September is about my favorite time for planting, as the onions get a good start before the dry weather sets in. Dark, moist loamy soil that can be watered is the best for onions. After the plants have been set about a month, destroy the weeds while they are small with the Dutch hoe, and keep this going as long as required. The land must be kept loose and free from weeds. I find some of the plants run to seed, the earlier sown being more likely than the later. It is not a good plan to pick off the seed heads, as these onions will not keep so well as the others. Allow the stems to remain, and when harvesting the crop place these onions aside for immediate marketing. When pulling the onions, lay them in rows, with the bulbs on the ground and the tops shading them. If the weather is fine leave them out for eight or nine

days to allow the sap in the tops to dry out. When bringing them into store cut off the tops, and pack in bushel cases, as they get bruised if bagged and carted. Place the onions in a loft or on shelves where they will keep dry, and have plenty of light and air. Onions do not keep so well on the floor.

The Chairman picks out round onions for seed, stores with tops cut to 1½ in. and lays the onions four or five deep; when they dry puts more on top. He allows them to lay out about fourteen days before storing, but thinks three or four days would be better, as they would have no chance of making second roots; the seasons generally prevent him from ploughing land required for onions. New ground gave best seed onions. Mr. Collins thought ploughing two depths best for onions. Mr. A. Green was doubtful whether they could compete with Mount Gambier. The soil should be ploughed with first rains, and kept scarified through the winter. Onions kept best with the tops cut, and the thinner they were spread out the better. He would advise keeping a piece of land for growing nothing but onions. Mr. Waters said he raised his own plants, sowing seed in March, but found the weeds very troublesome in the winter. He was going to sow seed where the plants are to stay and thin out later on, as they must reduce the cost of cultivation if they were to compete with Mount Gambier growers. He found the Brown Spanish the heaviest cropper. In reply to questions Mr. Sharpe said he had tried different brands of bonedust, but not the special "onion manure." He sowed the manure on the rough land and raked it in. Stored his onions about 14 in. deep.

PRUNING ORANGES.—Mr. Rogers wished to know how to prune an orange tree which was growing up too fast, being more like a creeper, and unable to carry its own weight. [Probably the best pruning in this case would be to cut the tree right down, as it is evidently in an unsuitable position. The soil is apparently too damp and rich, and the tree without sufficient air.—GEN. SEC.]

Golden Grove, June 30.

Present—Messrs. T. G. McPharlin (Chairman), J. R. Stewart, J. McEwin, J. Murphy, F. Buder, A. Robertson, John Ross, S. A. Milne, and A. Harper (Hon. Sec.).

EXHIBITS.—By Hon. Sec., twelve varieties of keeping apples.

CURE FOR "AMERICAN BLIGHT."—The Hon. Secretary related his frequently-repeated experiments in grafting blight-proof varieties of apples upon stocks that were nearly dead from attacks by the "woolly blight" (*Schizoneura lanigera*). In every case the result had been healthy, vigorous trees, free from blight on roots and branches.

WASHAWAYS.—A deal of damage has been done in the district through the flood waters caused by the recent rains washing away the soil. Mr. Milne said his paddocks had not suffered, because he had been careful to work his land in a direction crossing the natural course of the water flow.

Mount Bryan East, July 5.

Present—Messrs. H. Wilkins (Chairman), J. Prior, A. Pohlner, W. Brice, T. Wilks, F. Honan, W. H. Quinn (Hon. Sec.), and two visitors.

SEED AND FERTILISERS DRILL.—Messrs. Prior, Brice, Pohlner, and Honan hold the opinion that it will pay well to use the drill with either or both fertilisers and seed. Messrs. Wilks and Wilkins think that without the fertilisers drilling in seed is no improvement upon broadcasting it. Mr. Quinn argues that drilling in seed is far and away the best plan. When broadcasted a lot of seed falls into hollows, where it has no chance to stool out.

DEEP v. SHALLOW SOWING.—Messrs. Wilks, Brice, and Wilkins are of opinion that in dry seasons shallow sowing is best. Messrs Prior and Pohlner would advise deep sowing in dry seasons, as the plants will better withstand drought. Mr. Prior has ploughed in some seed; sowed another lot on ploughed land, harrowed after sowing; and then broadcasted with guano. He will report results.

Gawler River, July 1.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, J. Hillier, D. Humphries, A. Bray, H. Heaslip, R. Badcock, F. Roediger, G. Johnston, J. Bushbridge, H. Roberts, H. Roediger (Hon. Sec.), and two visitors.

PRUNING.—Mr. A. Bray read a paper to the following effect:—

The object of any system of pruning should be the production of finer, earlier, more regular, and abundant crops of fruit, as well as for prolonging the life and vigor of the plant. Each variety requires its own system of pruning, and it is necessary to study the nature and habits of each kind in order to find the best system of pruning it. The favorite is the goblet form; but for some of the upright varieties of pears the pyramidal form is better. The proper time to prune is when the leaves have fallen and the sap is dormant. As a rule, the trees and vines that are earliest pruned are the first to commence growing. Great care should be taken in "forming" young trees, because mistakes made at that time will take years to rectify. The main stem should be about 2ft. to 2ft. 6in. high, with three or four branches issuing from it at intervals of a few inches, and evenly balanced around the stem. If these branches start on the same level they are liable to split apart. From each of these, two more branches, evenly divided, should proceed next season, also separated so they shall not split. Nearly all fruit trees should be trained low to prevent damage by high winds and to facilitate spraying and the harvesting of the fruit. The peach tree produces its fruit on wood of the previous year's growth, and, in order to have new wood, it is necessary to prune very heavily. Apricots and plums produce their fruit on spurs of one, two, or more years' growth, and these should be shortened from time to time, because if left too long they die out. By shortening them they throw out new spurs at the base of the old ones. Apples and pears are produced on spurs of two, three, or more years' growth, and also require shortening for similar reasons. Pruning of quinces is very much neglected; but they will respond to proper pruning, and the fruit will be much finer on trees that are regularly headed back and thinned out. Citrus trees do not require a great amount of pruning, but branches which become unduly extended may be shortened, and the middle of the trees may be thinned just enough to allow light and air to gain admittance. The systems of vine-pruning may be grouped under three heads, viz., the gooseberry bush, the cordon trellis, and the espalier trellis. The espalier is the system when the canes are trained on both sides of the main stem; and the cordon trains them on one side only, which does away with the difficulty of balancing the vine, and the sap will travel just as easily 20ft. in one direction as it will travel 10ft. on each side. The bush vine should have a stem 6in. to 10in. long, with four main arms, each carrying two spurs. This bush system is adopted for many common varieties, but Crystals, Sultanas, Zante currants, and several of the higher class wine grapes must be trellised. On rich alluvial flats nearly all varieties of table grapes must be trellised to allow scope for growing. For these the horizontal cordon is well adapted. It consists of two-wire trellis, and the spur-pruned vine is trained in one direction along the lower wire, whilst the top wire supports the growth. For Sultanas and Zante vines Mr. Thomas Hardy's system of trellising is most favoured. This consists of three wires, the centre wire supporting the vine, and the other two running through a T piece bolted to the posts just below the centre wire. These pieces are 3ft. to 3ft 6in. long. The rods are tied to these outer wires alternately. In pruning, some cut just above the bud, others half-way between the buds, and others through the node. Professor Perkins advocates the latter system, because the nutriment for the first leaves comes from the internode above, and not from the roots; there is less liability of the shoots blowing off than if pruned close above the bud; and, in vines that require rod pruning, it is a great advantage to have a piece of dead wood at the extremity, as this enables them to be tied securely, without fear of shifting or of the wood growing and bursting the string. Topping, or summer-pruning of vines, is a pernicious habit, even when they are growing on a rich alluvial soil. Topping causes a second growth and the production of a second crop of grapes, which is weakening to the vine. The leaves are the lungs and stomach of the vine, and by removing leaves the vine is injured. Grapes exposed to the sun are tougher skinned and inferior in quality as compared with fruit shaded by the foliage.

In discussion Mr. Bray said it was unnecessary to trellis Muscatel vines, except on rich alluvial soil. Fig trees should be pruned sometimes. Mr. Johnston

said walnut trees require no pruning. Members consider it not profitable to grow walnuts in this district. The Chairman said root-pruning is practised where a tree grows too vigorously without producing much fruit.

VELVET BEAN.—The editor of the *Queensland Agricultural Journal* informed members, by letter, that he doubted that the Velvet bean would thrive in the dry climate of South Australia, though it does well in Queensland. It is not an edible bean. He also sent a few beans for trial.

RAINFALL.—For June, 3·820in.

Port Pirie, June 28.

Present—Messrs. E. J. Hector (Chairman), J. Lawrie, W. Smith, T. Gambrell, E. Stephens, and R. J. Ferry (Hon. Sec.).

FIELD TRIAL.—Mr. Lawrie reported that the field trial of agricultural implements arranged for by the North-Western Bureau Field Trial Society would be held near Warnertown on the second day of the Port Pirie show.

KAFFIR CORN.—Mr. Lawrie reported that the red and white Kaffir corn sown by himself on September 15, 16, 17, 1897, had grown vigorously to a height of 4ft. The white variety grew more strongly and stood better than the red; but the strong hot winds blew it down a good deal. Live stock and pigs relished it very much.

MANGOLDS.—Mr. Lawrie also had grown mangolds with good results. He ploughed deeply, used plenty farmyard manure and some salt. Farmers should grow mangolds, as they grow well in summer and provide early food in winter.

Brinkworth, July 7.

Present—Messrs. R. Cooper (Chairman), A. L. McEwin, H. Cornish, S. Aunger, G. Freebairn, J. Graham, J. F. Everett, J. Stott (Hon. Sec.), and one visitor.

BACON CURING.—Mr. A. L. McEwin read a paper to the following effect:—

Not many farmers thoroughly understand how to properly cure bacon so as to compete with factory-cured bacon; but they should be in a better position to compete, because, as a rule, their pigs are fed upon corn and milk, which is not always the case where factory pigs are concerned. Corn fed bacon is firmer and sweeter than that produced upon slops and offal. After thirteen years' experience he concluded that it is very easy to cure bacon at all times and seasons if proper care is taken, especially in hot weather. He greatly preferred dry-salting, but if brine is used the pork should be sprinkled with a little salt and saltpetre, and let it stand a day, or even two days, before putting it into the brine, to draw off the blood. His dry-salted bacon commands a high price. Flagstones or stone of any kind is preferable to wood, as stone keeps cool. Do not rub the bacon, and handle it as little as possible. Sprinkle a little saltpetre and salt on the meat, stack it one piece on the other, reverse the meat the following day, so that the top piece is at the bottom, and sprinkle more salt and saltpetre. After the second day sprinkle salt only when restacking the meat in reverse order. After the fourth day reverse the stack every second day, use no saltpetre, but sprinkle a little salt whenever required. From seven to ten days at most, according to size of the pig, is long enough for salting. Then thoroughly wash the bacon in a tub of water, hang it up for two hours to drain, then pepper and roll it, or hang it up in slitches in a dry, cool place. In three or four weeks it is fit for market. To prevent the lean meat going hard use carbonate of soda. Sugar is a very good thing to use in curing bacon. He seldom cures any meat with the bones in, but make the whole pig into bacon. Even the bone of the ham is removed. The great fault with many people is leaving the meat too long in the salt—ten days is the outside limit recommended. By leaving the hams on each side of a pig makes a nice roll without any bone, but to get an even roll requires a little skill and practice. To take the bone out of the ham enter the knife exactly in a line with the backbone, and cut straight down to the hock, which makes it roll perfectly round and shapely. In taking out the shoulder-blade pare the lean from the fat which opens right into the shoulder-blade, laying it back till

the first joint is reached: then by running the knife round the bone it comes out easily without cutting the bacon out of shape for rolling, and the roll will cut in nice slices for frying without breaking into small pieces. Do not mix pepper with the salt, sugar, and saltpetre, but sprinkle the pepper on last, and leave it on the bacon. Bacon should be so cured as not to require soaking or dipping in scalding water before being cooked, as this removes part of the flavor. Too much salt spoils the food, and keeps the consumer thirsty all day long. When curing meat with the bones in it is necessary to see that the salt and saltpetre gets well around the bone. It is a good plan to run a skewer along the bone to let the salt penetrate quickly. Sometimes a whole side cured with the bone in will sell as well as if the bone were removed. If a large quantity of pork is being dealt with it will be wise to make rolls, flitches, and hams, so as to have a variety to suit all requirements.

In answer to questions, Mr. McEwin said it made no difference what weather he had if he only had a cool night to set the meat when killed. To avoid rusty bacon he would sew it up in bags and dip in lime wash. He preferred a cross of pure Berkshire boar with any common breed for bacon purposes, but did not value the pure Berkshire. Mr. Freebairn favored bran or chaff for packing bacon to avoid rustiness.

RAINFALL.—Mr. Freebairn reported fall at Condowie for June, 4.13in.; for six months to June 30, 9.05in. Such a heavy fall in June has not been known at Condowie during five years. In June, 1893, there was 3.78in., with 14.00in. for the year. Hon. Secretary reported rainfall at Brinkworth for June, 3.540.

Gladstone, July 2.

Present—Messrs. J. Tonkin (Chairman), J. Greig, J. Sheppard, J. H. Rundle, E. Matthiessen, B. Griffiths, J. Brayley, J. Gallasch, C. Gallasch, J. Prior, W. A. Wornum, and J. Milne (Hon. Sec.).

DISC PLOUGH.—Chairman reported on the trial of Clutterbuck's disc plough, which was considered would work very well on suitable land.

INSPECTOR OF FRUIT.—Members expressed their appreciation of Inspector Quinn's report on experimental treatment of orchard for suppression of codlin moth, and generally of the work done by that officer.

COPRA CAKE.—Mr. Brayley stated that he had fed his fowls once daily with copra cake with very satisfactory results.

Mundoora, July 1.

Present—Messrs. J. Black (Chairman), T. Watt, R. Harris, J. Loveridge, W. D. Tonkin, W. J. Shearer, W. Atkinson, A. McDonald, and A. E. Gardiner (Hon. Sec.).

DIFFICULT FARMING.—This was the subject discussed. Scarcity of water was considered the greatest drawback in this locality. The land is sandy, and water soaks into the soil before it can lead into reservoirs. Beetaloo reservoir water at 6s. per 1,000galls. is much too costly for use in farming, as it absorbs a deal of income that ought to be laid out on fertilisers and labor-saving implements. The Chairman recommended farmers to make every effort to erect dams and excavate reservoirs for the conservation of the rainfall, and thus secure provision of water for their live stock.

REPAIRING OLD FENCES.—The necessity for some more simple device for tightening up wires in fences than at present known was mentioned by members. If it could be carried on horseback it would be still better. To keep the wires tight is half the battle.

WARTS ON COWS.—Mr. Vanstone reported that he had successfully treated the warts on the teats of his cows with bluestone.

Stansbury, July 2.

Present—Messrs. Alexander Anderson (Chairman), C. Faulkner, George Jones, James Sherriff, and George Sherriff (Hon. Sec.), and one visitor.

GRUBS.—The Chairman reported that caterpillars are very prevalent amongst the cereal crops, and earlier than ever before. They hide in the soil during daylight, but attack the crops at night. Rolling, harrowing, and treatment with dissolved arsenic were mentioned for experimental remedies. Members stated that these pests were so plentiful in places that it was feared that it would be necessary to re-sow the crops.

CROP PROSPECTS.—Seeding is just finishing. Nearly all crops have been sown by drill along with fertilisers. The early-sown fields look well, but a good fall of rain would benefit them all.

Gumeracha, June 27.

Present—Messrs. W. A. Lee (Chairman), A. Moore, G. F. Nepean-Smith, R. P. Scott, W. J. Hannaford, D. Hanna, S. Gent, J. Monfries, Dr. J. R. Stephens, and Dr. Gray Nicholls (Hon. Sec.).

EVENING SCIENCE CLASSES.—The Hon. Sec. reported that the proposal of the Branch to establish evening classes had fallen through, owing to lack of interest by those whom it was proposed to help.

MANURES.—In reply to inquiry, Professor Lowrie wrote to the following effect:

There can be little satisfaction in adhering to any definite formula in the use of manures; soils vary so much and are impoverished so variously according to the character of the cropping to which they have submitted that the farmer must exercise his own judgment and read his fields carefully to be guided, both in regard to kinds and quantities of manure to apply.

Wheat.—(a) Phosphatic manure alone, about 2cwts. per acre. The chief phosphatic manures are bonedust, superphosphates (bone or mineral), basic slag, and phosphatic guano. (b) For land deficient in nitrogen: (1) $1\frac{1}{2}$ cwts. to $1\frac{3}{4}$ cwts. super., and $\frac{1}{2}$ cwt. to 1cwt. sulphate of ammonia; (2) 2cwts. basic slag and $\frac{1}{2}$ cwt. to $\frac{3}{4}$ cwt. nitrate of soda; (3) $1\frac{1}{2}$ cwts. bonedust, and $\frac{1}{2}$ cwt. to $\frac{3}{4}$ cwt. nitrate of soda or sulphate of ammonia. Sour land may require quicklime, also light sand; apply this in dressings of 2 tons or thereabouts per acre. Occasionally light lands may also require potash and the mixture might be some such as $1\frac{1}{2}$ cwts. super. or bonedust, $\frac{1}{2}$ cwt. to $\frac{3}{4}$ cwt. sulphate of ammonia, and 3cwts. wood ashes or $\frac{1}{2}$ cwt. kainit. Lighter or heavier dressings may be made according to condition of the land.

Potatoes.—(a) Wood ashes in abundance or kainit or sulphate of potash. Muriate of potash is said to cause waxy potatoes; (b) 4cwts. to 5cwts. wood ashes and 3cwts. to 4cwts. or more of super or bonedust per acre (see note re mixing ashes and super); (c) 4cwts. to 5cwts. wood ashes with 3cwts. bonedust and 1cwt. of nitrate of soda—this is a substantial dressing for colonial practice, but light compared with practice in older countries; (d) farmyard manure, and plenty of it, invariably enhances the yield greatly, but is said to make potatoes scabby.

Lucern.—Bonedust in abundance—4cwts. up to 10cwts. according to crop yielded—applied annually at the time the lucern is cultivated in the winter. Gypsum also is useful, as is quicklime in good heavy dressings occasionally, not in hundredweights but in tons; 2 tons is generally little enough.

Swedes.—Superphosphate in abundance.

Mangolds.—Nitrogenous salts especially. A good dressing is, farmyard manure, 8 tons to 10 tons per acre, $1\frac{1}{2}$ cwts. bonedust or super, and 1cwt. sulphate of ammonia or nitrate of soda, together with 2cwts. to 3cwts. common salt.

Incompatibles.—(i.e. Should not be mixed). (a) Nitrate of soda and super; (b) super and quicklime; (c) basic slag and sulphate of ammonia; (d) lime and sulphate of ammonia; (e) wood ashes and super should not be mixed long before application, and are better applied separately.

MILK-TESTING AND PAYMENT BY RESULTS.—Mr. W. A. Lee read the following paper on this subject:—

In dealing with the above question the object of the writer is not to set up as an authority on the subject under review, but rather to try to explain the process of milk-testing as carried out in most of the leading factories in the colonies at the present time, and to do this

in such a way that those interested—the suppliers—may get a better insight into the process, and the advantages of payment by the result system than obtains at present. There is a certain amount of prejudice and misconception among some suppliers on many minor points in the process, and our aim will be to explain these as clearly as possible, giving my own observations and practical working of the Babcock tester, supported by leading authorities in the colonies and America.

It may not be out of place here to give the composition of milk. Milk is a compound of a number of solid substances dissolved and suspended in water, casein, ash, sugar, and albumen. These substances, together with the water in which they are dissolved, constitute the milk serum. The fat in the milk is not dissolved, but is suspended in the milk serum, being in the form of very small globules, 5,000 of them being required to measure 1 in. The casein in milk is the curd, there being about 3 lbs. in every 100 lbs. of milk. This is a valuable food. Albumen is present to the extent of about $\frac{1}{10}$ lb. in 100 lbs., and milk sugar, which plays an important part in butter and cheese making, 5 lbs., to the 100 lbs. Milk fat is familiar to us as the produce known as butter. Milk fat and butter, however, are not the same, as "milk fat" is pure dry fat, free from water, salt, or casein, while butter contains all three of these materials. There are about 83 lbs. of pure fat in 100 lbs. of butter.

With the epoch of modern dairying, which dated from the introduction of the separator, invented by Dr. Gustav De Laval, the methods of dairying have been completely revolutionised, and the evil of purchasing milk in quantities, irrespective of quality, seriously engaged the attention of dairy experts, and under the factory system this not only opened the door to dishonesty and adulteration, but acted detrimentally to the farmer who had carefully selected his herd of cows for their butter-producing qualities—the tendency being to produce large quantities of milk without respect to quality.

In 1890 the Babcock tester came into use, superseding other more or less cumbersome and troublesome methods of milk-testing, and it proved to be a simple and effective way of arriving at the butter value of milk, and, after being carefully tested by many chemists, proved to be perfectly reliable and satisfactory in its working, and at the World's Fair, Chicago, the machine was also submitted to very elaborate tests, resulting in establishing the absolute accuracy of the tester. An American writer says:—"The Babcock tester clears away what you may call the personal equation; it clears the moral cobwebs out of this business," and again, "I have been quoting Scripture to my people for years and could not improve them; I put in a Babcock tester and everything came right to time." The Euroa factory, in Victoria, was probably the first to adopt this system in the colonies, and we are indebted to Mr. C. C. Lance, late secretary of that factory, and Mr. H. W. Potts, analytical chemist, of the same place, for a large share of the information we have on this system, which has now been adopted by the greater number of factories throughout Australia.

Sampling.—It is absolutely necessary that samples should be taken every day, as it is now well known that the daily variation in the quality of milk is considerable, although the cause is not so easily determined. Although samples should be taken every day in factories having a large number of suppliers, daily testing could not be carried out, and then the "composite sample" system is adopted, i.e., daily samples taken and tested once a week, giving an average sample. The accuracy of this method has been completely established. To obtain the sample the drip system is generally adopted, the night's milk being first strained through a fine cloth, the morning milk poured in afterwards—this will usually warm and soften any particles of cream from the night's milk which may adhere to the strainer. The milk being in motion and thoroughly mixed runs through a pipe and passes over a small hole, through which a fair proportion drips; this is poured into a composite bottle with the supplier's number attached. This being done every day, we have the composite sample for testing. These samples are kept sweet by putting a small quantity of boracic acid or formalin in each bottle and gently shaking or stirring every time a fresh sample is put in. If milk is perfectly sweet and sound when the samples are taken it can be satisfactorily tested at the end of a week, or longer in the winter time.

Testing.—Suppliers sometimes think that the tests are incorrect and that mistakes have been made in the quantities of milk or acid, when samples vary considerably as they do in some instances, but, as the instruments used are so carefully made and adjusted, it is impossible for this to happen with ordinary care. I find that before taking the sample for testing it is well to place the bottles in warm water for a short time in cold weather, as by gently shaking the cream is more thoroughly mixed. A pipette is then inserted, and the exact quantity of milk required (17.5 cubic centimetres) is taken out and placed in the test bottle and 17.6 cubic centimetres of sulphuric acid added; the bottles are then shaken to mix the milk and acid, placed in the machine, which is turned at the correct speed, from five to seven minutes; boiling water is then added to the mixture; the machine is turned again for a minute or two to cause the fat to rise into the neck of the bottles and the test is complete. The neck of the bottles being graduated the column of butter fat is measured off with a pair of compasses, the result being entered and averaged at the end of the month. The percentage of butter fat is thus easily ascertained.

In paying for milk by results the plan usually adopted is to take the average price of butter for the month, and deduct the cost of making and a margin for contingencies, and base the value of milk on the net price of butter, *e.g.*, if a pound of butter is worth 1s. per pound net, the price per gallon would be as follows :—

Test.	Pounds of Milk to 1lb. Butter.	Price.
3·0	30·6	4d.
3·4	26·47	4½d.
3·8	23·7	5 ³ / ₈ d.
4·0	22·5	5 ⁷ / ₈ d.
4·6	19·3	6½d.
5·0	17·7	6 ¹ / ₂ d.

We do not say that this table is absolutely correct, but as the gallon values are in sixteenths of a penny it would amount to only about 2s. 6d. in 1,000galls.

A few words about variation in quality. As I mentioned before, those who have carefully studied the question cannot state positively what are the causes of the variation, but the changes in the weather, pasturage, change of milkers, doubtless have some effect. In the latter case, if cows are carelessly milked or not stripped clean, the difference would be very marked, as the strippings contain a much greater amount of butter fat.

Variation in Quality.—Tests have been taken from a herd of twenty-seven cows, ranging from 1·8 to 4·1, average 3·4. Tests taken at the beginning of milking contained ·8 of fat, whilst the strippings tested 7·8

Cows have been known to vary from 9·2 to 3·9, 9·2 to 1·8, and so on. Whole dairies vary from day to day, but in a lesser degree.

Advantages of Testing.—At the Euroa factory, before the adoption of payment by results, it required 27·8lbs. milk to produce 1lb. butter, a test of 3·3 per cent. of butter fat, the average at the present time is 23 lbs. milk, or a test of 3·9 per cent. In our own factory here the difference between the average tests of individual suppliers is most marked, and points very clearly to the fact that closer attention will have to be paid to the class of cows kept, and the necessity and advantages of proper feeding. To support this I have only to quote the results of two farmers who are supplying milk at the present time to show what can be done in this direction by careful and intelligent management and attention.

In the first case the cows received no hay or chaff, but were frequently changed from one paddock to another, some being lucern. The herd averaged 362galls of milk, test, 4·2; price, 5d. per gallon; total, £7 11s. per head for eight months only. In the second case the cows have been well fed with bran, chaff, and other things, with the result that the averages for the year are 588galls. of milk, 4·3 test, 5½d. per gallon for milk, or a total of £12 per cow. These results are very much above the average for the district. These are facts, and speak for themselves. Some milk is worth 3d. per gallon more than other samples, and in paying according to value an incentive is given to those who have spared neither time, trouble, nor expense in procuring and keeping only the best milking strains, and for those who have not already done so to follow in their steps.

A good discussion followed. Mr. Monfries found that by keeping the cows under shelter their returns were much enhanced. Mr. Hanna thought they should weigh the milk from each cow daily, and test it occasionally for quality; but Mr. Lee pointed out that diurnal variations were so great that occasional testing would not do. Mr. Hannaford advocated milking the cows out of the bail, and Mr. Moore thought spayed cows would give better results than those not treated. The beneficial effects of kindness in milking the cows was touched on.

Appila-Yarrowie, July 1.

Present—Messrs. J. Wilsdon (Chairman), P. Lawson, A. Fox, C. W. H. Hirsch, J. M. Grant, N. Hannagan, J. H. Bottrall, W. Stacey, J. O'Connell, J. Daly, W. C. Francis, J. W. F. Hill, C. G. F. Bauer (Hon. Sec.), and H. Borgas (Hawker Branch).

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the past year the average attendance of members was a little over ten. Five papers were read and discussed. He regretted more interest was not taken in their work by the surrounding farmers. Messrs. J. Wilsdon and P. Lawson were elected Chairman and Vice-chairman, and Mr. Bauer re-elected Hon. Sec. for ensuing year.

IRRIGATION.—Mr. Francis read a paper on this subject to the following effect:—

The past three or four seasons have been very deficient in rainfall, and a great deal of attention has been given all over the colony to the conservation of water for irrigation and other purposes. The three things considered essential to successful irrigation are plenty of good water, good land, and proper cultivation. If we can get the first we will have no difficulty about the others. We all know what crops this district will produce if sufficient moisture is provided. The floods in the Appila Creek, caused by thunderstorms, overflow the banks, and the flooded patches give wonderful returns, even when the natural rainfall is deficient. Nearly every year the thunderstorms in the early part of the year, and especially in dry seasons, cause the creek to run, and millions of gallons of water go to waste, which, if conserved, would be sufficient to irrigate several hundreds of acres. If the rain is not sufficient to fill the reservoir, there are springs about five miles up the creek which could be opened up. About 12 in. of water per annum—equal to say 270,000 galls. per acre—will be enough with the natural fall for our requirements. A reservoir to contain sufficient for a number of small irrigation blocks would, he believed, be filled every year, and he hoped some steps would be taken to bring the matter to a head.

Several members supported Mr. Francis, and agreed that sufficient water could be conserved in the Appila Creek to irrigate a great portion of the rich Appila plain. Other members considered the expense would be too heavy to allow profitable use of the water for irrigation, and some referred to the danger of the supply running short in such seasons as we have just passed through, and in such cases the blockers would lose their trees, the fruit perhaps of several year's work.

PRUNING.—By means of a large branch of a fruit tree Mr. Bauer gave demonstrations in the different modes of pruning.

SEED DRILL.—Mr. Stacey said he was well pleased with the work done by the seed drill. It covered a width of 10 ft. 8 in. at one operation, and took four horses to work it.

Nantawarra, July 4.

Present—Messrs. S. Sleep (Chairman), R. Uppill, H. J. C. Meyers, A. F. Herbert, E. J. Herbert, A. L. Greenshields, C. Belling, R. Nicholls, J. Nicholls, J. W. Dall, and T. Dixon (Hon. Sec.).

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that the interest in the work of the Branch had been well sustained. Three papers had been read and discussed, and a day was set apart for the inspection of crops put in with the seed and fertiliser drill. The result of this work has been that this year a large proportion of the crops in the district has been sown with the drill. Owing to the season the results of their experiments with seeds had been a failure. Messrs. C. Belling and E. J. Herbert were elected Chairman and Vice-chairman respectively, and Mr. T. Dixon re-elected Hon. Sec. for ensuing year. It was decided that a day be set apart this year for the inspection of the crops in the district, and to invite Professor Lowrie to attend.

SAND IN HORSES.—Mr. E. J. Herbert tabled two lots of sand which had been removed from two of his horses by injecting soapy water. The horses were very bad, but this treatment had a beneficial result.

MALLEE POSTS FOR FENCING.—Mr. Myers said he found that mallee posts cut from July to September and put up green stood much better than if left for a year or two to dry before using. Members generally left the posts to dry for a year or two first. Mr. A. Herbert said it was a good plan to go round the fences a year or so after erecting them and cut the bark or outside wood from any posts attacked by white ants, leaving the ants exposed. He frequently noticed the ants leave the posts so treated. The Hon. Secretary said he was trying the effect of leaving the butt ends of posts for twenty-four hours in bluestone water left from pickling his seed wheat; as the water absorbed he added strong brine.

Holder, July 2.

Present—Messrs. F. A. Grant (Chairman), J. E. Trimming, G. Bennett, J. Green, H. Blizard, P. J. Brougham, J. Rossiter, J. Maddocks, J. Mitty, E. Crocker, C. Anderson, and J. J. Odgers (Hon. Sec.).

BUSINESS.—Several members reported on growth of seeds received from Central Bureau. It was decided to hold a show of produce, flowers, &c., at Holder during second week in October.

Bowhill, June 31.

Present—Messrs. W. G. F. Plummer (Chairman), W. Towill, C. Drogemuller, A. Dohnt, J. Waters, W. Sears, J. McGlashan, J. G. Whitfield, H. H. Plummer (Hon. Sec.), and five visitors.

SEED EXPERIMENTS.—Members reported wheats received from Central Bureau were making satisfactory growth, and some promised to be very suitable for this district. The Chairman tabled White Stone turnip 23in. in circumference from Bureau seed sown in March, and not irrigated or manured.

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the year ten meetings were held, the average attendance, 8·4, being below last year, and generally there seems to have been a lack of interest on the part of several members. Seven papers were read and discussed, a number of trials of seeds reported on—unfortunately owing to the season these were not very satisfactory—an arbor day arranged, and question of holding a united show of produce in connection with the River Branches considered and approved. In all probability this show will shortly be held, and will be made an annual affair. Messrs. J. G. Whitfield and W. Towill were elected Chairman and Vice-chairman, and Mr. H. H. Plummer re-elected Hon. Sec. for ensuing year respectively. It was decided to ascertain cost of show case for preserving specimens of insects, weeds &c., identified by the Central Bureau. It was decided to hold arbor day on August 4. Arrangements in connection with the proposed combined Branch Show were also made.

Elbow Hill (Franklin Harbor). July 5.

Present—Messrs. E. Wake (Chairman), C. G. Ward, J. Elleway, James Spence, H. Dunn, W. Spence, G. Wheeler (Hon. Sec.), and sixteen visitors.

DONATION.—Mr. G. L. Ware presented a large quantity of seeds for distribution, and was accorded a vote of thanks for his donation.

GRUBS.—The Chairman reported that large numbers of grubs were doing mischief in his garden. Mr. Elleway said he found spraying with strong soapuds or weak bluestone water beneficial. Stable manure seemed to encourage the presence of this pest.

OPHTHALMIA.—Mr. G. Dunn reported that one of his horses was gradually getting blind, a white scum appearing over the eyes. [Bathe the eyes thrice a day with 4ozs. tincture of opium in a quart of water.—GEN. SEC.]

DAMP-WEATHER V. ORDINARY STRIPPERS.—The Hon. Secretary initiated discussion on this subject. He had had several years' experience with both, and was of opinion that the ordinary stripper was best. One great thing was lightness of draught. The stripper should be taken along at a fair pace, while thrashing was only a matter of pace. Get a mile an hour extra pace in cool weather and you have the same result as from a damp-weather stripper. He had never seen a stripping machine in good working order, driven at a good speed, that would not thrash well; but speed could only be obtained by

means of light draught, especially on loose scrub land. He thought the chief cause of machines pulling heavy on loose land was the shortness of the platform, bringing the steering wheel too close to the crown wheel. Some members thought the damp-weather stripper a decided advantage, while others thought its advantages minimised by the excessive draught. The Chairman considered the damp-weather stripper the better machine. There was no doubt the platforms should be longer to lighten the draught. In a short time he believed they would have to adopt the binder, in order to save the straw and enable them to commence the harvest at least a fortnight earlier.

CROSSBRED SHEEP FOR FARMERS.—Mr. Elleway considered that the cross of the Lincoln ram on Merino ewes the best sheep for the farmer, as they were very quiet, fattened quickly, and the meat was of better quality than the Merino. The Chairman thought better results would be obtained from the opposite cross, using Merino rams, as sheep throw more to the sire than to the dam; consequently the wool from the Merino-Lincoln cross would be more valuable, and the percentage of lambs would also be higher from Lincoln than from Merino ewes. Mr. Elleway said loss of lambs was often caused by using the ewes too young. No good farmer will keep more stock than his land will maintain in good condition. The addition of pollard to their food was beneficial: 1 ton was enough to fatten 100 crossbred sheep.

FODDER PLANTS—In reply to inquiry several members stated that lucern had been tried in the district without success, but the tree lucern (*Cytisus proliferus*) did very well. Mr Ward wished to know which was the best kind of grass to sow in this district. [Our own hardy perennials will probably do best. Seed should be saved when possible and given a trial. Johnson grass should also do, but must not be sown in land likely to be required for anything else. Very few, if any, of the introduced grasses will stand our long dry summer.—GEN. SEC.]

LEAKY TANKS.—Mr. Dunn wished to know best way to stop leaks in a cemented tank. Members would like experiences of other branches. [Mr. G. H. Dunn, of Johnsbury Branch, stated some time ago that he had successfully repaired leaks in cemented tanks in the following way:—With a cast-steel chisel cut out each crack about $\frac{1}{4}$ in. in width down to the full depth of the cement, give a coat of red lead, then fill up tight with good putty, and apply another coat of paint. A tank he had repaired in this way held water for ten years.—GEN. SEC.]

Arthurton, June 30.

Present—Messrs. W. Short (Chairman), H. J. Freeman, M. Lomman, W. H. Hawke, J. Koch, C. Koch, T. B. Wicks, J. Pearson, W. Baldock, H. Baldock, H. Short, J. B. Rowe (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—This meeting was held at the residence of Mr. C. Koch, and amongst the items of interest seen during an inspection of the farm were some splendid turkeys, the Massey-Harris seed drill, and a 15-tine scarifier for working on plain land. Some members thought this would be a splendid thing to run over the fallow land after being ploughed to destroy any weeds that may spring before seeding. Other member, however, considered a paring plough better for this, as the weeds could be turned under to any required depth. The seed drill was much admired for its finish, lightness of draught, and distribution of the manure, but many complaints are made about the uneven way the seed is distributed.

ANALYSES OF FERTILISERS.—Mr. W. H. Hawke stated that he had kept samples of all the manures he had purchased during the season with a view to having them analysed, as he thought by doing this it would force the

sellers to keep their fertilisers up to their guarantee, and as the district generally would benefit from the publication of the analyses he suggested that the Branch should contribute towards the cost. It was decided that the Branch should pay the expense of this work.

OVER-CROPPING AND OVER-STOCKING.—Mr. T. B. Wicks read a paper on this subject:—

I have taken these two subjects together because they have the same effect, *i.e.*, impoverish the land. The practice in the past has generally been to get everything possible out of the land and put nothing back, with the result that much land has gone out of cultivation, and the losses of stock have been severe. A reserve should be maintained in the feed and in the soil, and as a rule this can readily be done by careful management. A paddock of dry feed should always be reserved for winter feed, unless a good supply of fodder is otherwise provided. It is often said the stock improves the land, but actually this is quite contrary to fact. Stock impoverish the land in two ways, first, by what they take off the land, and, secondly, by cutting up the surface so that it is swept by the winds and rain until the best of the surface soil is lost. There is abundant evidence all through the country of the evil effects of over-stocking even in pastoral country, where a great deal of our best natural herbage has been destroyed. One sure proof that grazing impoverishes the land is seen in the fact that stock land when cropped for the first time does not give anything like such good results as the same class of virgin land did in the early days. I believe the practice of using artificial manures will double the carrying capacity of the land for stock. One way of providing for extra strain on the feed requirements through long droughts is to plant a piece of land with sheoaks. This is within the reach of everyone. Seed should be sown broadcast after the land has been ploughed, and a stock-proof fence erected round the plot. Instead of destroying these trees when wanted for stock they should be trimmed only.

Over-cropping is growing the same kind of crop for years without any change. If the crops are varied sufficiently it is a question whether it is possible to overcrop the land. There is one thing very sure, and that is we cannot, even with the aid of artificial manures, continually grow nothing but wheat. In the older countries, where the land is heavily manured, they never dream of taking two successive crops of wheat off the same land. As climatic conditions do not allow us much scope for change of crop we must either give the land a good rest, fallow it, or keep off stock from the paddocks and burn them off. My experience has been that oats after wheat prevents takeall, and although there is not much profit in oats they provide good horsefeed and indirectly benefit the land.

Some discussion ensued, and in reference to suggestions that small paddocks should be planted with sheoak trees for feed for stock in time of drought the Chairman stated he had kept several horses alive last year on clippings from these trees.

Amyton, June 30.

Present—Messrs. Jos. Gum (Chairman), John Kelly, John Gray, A. Gray, W. Mills, W. Hawke, H. Turner, and S. Thomas (Hon. Sec.).

OFFICERS.—Messrs Jos. Gum and S. Thomas were re-elected Chairman and Hon Sec. respectively for ensuing year. A committee was appointed to draw up programme of subjects for discussion for next six months, and to select the members to take up the subjects selected.

FIELD TRIAL.—It was decided to endeavor to arrange for a field trial of the new patent disc ploughs.

ECONOMICAL FARM MANAGEMENT.—Mr. A. Gray initiated a discussion on this subject. Being so often sufferers through deficiency in the rainfall it was imperative that the farmers of the district should work their farms with the least expenditure possible to secure good results. He believed that in time traction oil engines would largely replace horses on the farm; the engines could work at cost of 4d. per hour, as against 1s. 6d. per hour for horses, and he thought the time not far distant when such an engine, suitable for ploughing, wheat-carting, &c., would be introduced. In the meantime they should use skim ploughs in the place of the scarifier, and either plough the seed in or attach a drilling apparatus to the plough. He had formerly advocated cropping for two years and then giving the land a rest, but he was now

convinced that cropping fallow land only was better, as there was less labor and expense generally. On an average 200 acres of fallow land will yield as much as 300 acres, half-fallow and half-cropped the previous year. Fallowing could be done on the grass, but in ploughing stubble land for seeding the horses would require extra feeding. There would be a saving of say 50 per cent. of seed also by only cropping fallow, while one man could reap 200 acres, but it would require two men to do 300 acres. In bad seasons crops on stubble land were generally failures.

Calca, July 2.

Present—Messrs. J. Bowman (Chairman), W. Wilcott, A. Newbold, D. P. Thomas (Hon. Sec.), and four visitors.

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the year ten meetings were held, with an average attendance of six members. Mr. A. Newbold was elected Chairman and Mr. D. P. Thomas re-elected Hon. Sec. for ensuing year.

FIELD TRIALS.—It was decided to hold a field trial of seed drills and gang ploughs on September, and to offer gold and silver medals for competition.

JOHNSON GRASS.—Mr. Newbold wished to know on what sort of soil, at what time of the year, and how to prepare the soil in order to get good results from Johnson grass. [On almost any light, moist soil this grass will flourish. If soil is rather heavy break it up fine and sow seed about August or April. Light soil will require very little cultivation.—GEN. SEC.]

Colton, July 2.

Present—Messrs. P. P. Kenny (Chairman), W. J. Packer, E. Whitehead, A. S. Bartlett, M. S. W. Kenny, J. L. Dennison, W. A. Barnes, R. Hull (Hon. Sec.), and one visitor.

FIELD TRIALS.—Some discussion took place on reports of trials of the patent rotary disc ploughs, and it was decided to ask the agents to show one of these implements at the Colton show on October 5.

CABBAGE PEST.—Mr. Dennison wished to know if there was any real remedy for "blight" of cabbages. Members did not know of any. [What is meant by blight—aphis or caterpillars? Remedies referred to in previous issues of *Journal of Agriculture and Industry* have proved successful when used early for both these pests.—GEN. SEC.]

PIG COMPLAINT.—Mr. White had stated that he had recently noticed pigs whose skins were covered with cracks and sores, and wished to know cause and remedy.

Tanunda, July 6.

Present—Messrs. P. Trimmer (in chair), W. G. Thomas, W. Graetz, G. Mann, W. A. Ohlmeyer, C. Heinemann, E. Trimmer (Hon. Sec.), and one visitor.

GRAFTING VINES.—Considerable discussion on this subject took place, members being of opinion that great care should be exercised in the selection of scions, as if water shoots were used the members thought the grapes would be inferior. Members wished to know whether using scions from grafted vines was likely to lead to deterioration in quality. [Professor Perkins says "No."—GEN. SEC.]

Watervale, July 4.

Present—Messrs. C. A. Sobels (Chairman), S. Solly, E. Leithbridge, W. Field, F. E. Sobels (Hon Sec.), and one visitor.

“**SOURSOPS.**”—Mr. Field inquired as to best means of eradicating “soursops” (*Oxalis cernua*). [Break up the soil and turn pigs or turkeys on to the patch. —GEN. SEC.]

MANURING ORANGES.—Mr. Field wished to know best manure for oranges. Some members recommended wood ashes and decomposed vegetable matter. Mr. Leo Buring advised use of well-rotted stable manure in well-drained land. [Forcing manures should not be used, and although well-rotted stable manure in frequent light doses is very good, too much of it will tend to the production of coarse fruit. Bonedust and wood ashes will be found very beneficial. —GEN. SEC.]

GRAFTING.—A discussion ensued as to the best method of grafting, *i.e.*, bark or cleft. Members advised substitution of budding for grafting whenever good young growth can be obtained.

KAFFIR CORN.—Members reported that this plant promised to be worthy of cultivation on a more extensive scale. It appears to keep green very late in the season, stools well, with broad long flag, though it has failed to set seed.

Quorn, July 7.

Present—Messrs. J. B. Rowe (Chairman), G. Altmann, C. Patten, James Cook, and A. F. Noll (Hon. Sec.).

PICKLING SEED WHEAT.—The Hon. Sec. read a paper on “Pickling and Removing Smut Balls,” to the following effect:—

If bunt balls are left in the pickled seed wheat they will probably be crushed when passing through the seed-sower or drills, and the seed will be again infected. The bunt balls must therefore be removed. In a cask about 2ft. 9in. deep and 2ft. wide keep the bluestone solution. In this is a bag with a ring of half-inch round iron sewn on top, which rests on the rim of the cask. This bag is tied at the bottom with a loop. Over the cask place a sieve, through which pour the seed wheat, when bunt balls, oats, whitecoats, &c., will float out and can be skimmed off. A tin dipper with perforated bottom to let liquid through will do for this. Put through about ½ bush. of seed and then skim. Then lift the bag and pickled seed out of the cask by means of a derrick (a post with swinging arm near the top). Near the end of the arm on the derrick is placed a block-pulley with rope. On end of the rope is a hook, which takes hold of a ring attached to three short pieces of rope, which are fixed on the ring of the bag in which the wheat was pickled. Pull the bag up out of the cask, let the liquid drain back into the cask, then draw the arm of the derrick around with the bag hanging to it. Place an empty bag beneath, suspend it by means of two S hooks to the iron rim of the pickling bag, pull the loop to let the seed run out into the empty bag. Then repeat the operation. The solution is best made by placing the bluestone in a piece of bran bag, and hanging it in the water near the surface. Use from 4ozs. to 8ozs. for ½ bush. of grain.

The Chairman suggested that the members should carry out experiments by sowing smutty seed, pickled and unpickled, also clean wheat contaminated by being mixed with broken, also smut balls alone. Members were strongly of opinion that it was a mistake to say bunt balls would germinate and produce a plant of themselves.

Johnsburg, July 2.

Present—Messrs. F. W. Hombsch (Chairman), H. Napper, L. Chalmers, G. H. Dunn, H. Arnold, W. McRitchie, T. Thomas, T. A. Thomas, J. Sparks, P. Caughlan, W. James, J. R. Masters, T. Johnson (Hon. Sec.), and three visitors.

PAPER.—Mr. T. A. Thomas read his paper on "Establishment of a Reserve Fund for Farmers," which was well discussed. Members were of opinion that if such a scheme could be properly established on a sound basis it would be of great help to farmers in times of distress. Mr. Thomas was asked to read his paper at the forthcoming Congress.

RAINFALL.—For June, 2·880in. at Johnsbury, and heavier in other parts of district.

Naracoorte, July 9.

Present—Messrs. O. Hunt (Chairman), H. Buck, S. Schinckel, J. D. Smith, J. Wynes, D. Findlater, D. McInnes (Hon. Sec.), and two visitors.

CULTIVATION OF ORCHARDS.—The Chairman read a short paper on this subject. He advocated early ploughing so as to let the rain soak in, but did not agree with the Inspector of Fruit and others who advised deep ploughing, as the surface roots, on which the fruit crop largely depended, would be cut, and the garden would soon be a mass of suckers. Shallow cultivation, not more than 4in. deep, was the best. Where manure of any kind is used, put it on now and plough it under, so that the trees may get the benefit of it before the dry weather sets in. When ploughing do not walk the horse in the furrow, as it only sets the bottom soil tight. Where the soil is inclined to bake hard, cultivation should be done when it is as dry as it will conveniently work. If the soil is stirred in the spring with chisel-pointed harrow or scarifier, and the weeds kept down, the trees will not be much affected by drought. Mr. Findlater said he planted twenty trees last season, digging the holes out to a depth of 5in., and put manure in the bottom. All the trees succumbed to the drought. The Chairman thought the manure killed the trees. If any manure is used when planting it should be in small quantities and thoroughly mixed with the soil. He had planted a number of trees during past three or four seasons, planting near the surface, and cultivating shallow, and although they had experienced exceptionally dry summers, he had not lost a single one.

SALT AS A MANURE.—The Chairman read extract from Melbourne paper re value of salt as a manure, in which it was stated that "Many instances of greatly improved fertility due to the action of salt are given through the salt acting upon the crude elements of plant food, liberating and converting them into an easily assimilable condition. Upon mangolds, turnips, and carrots salt has a specially good effect. Besides its tendency to absorb moisture from dew, being thus often very valuable in securing a braird in a dry seed time, it is also of benefit in counteracting the effects of obnoxious insect life. Ground rocksalt is also used as a mechanical aid in sowing commercial fertilisers, and is well known as a specific for checking the ravages of the wire worm or grub in barley and oats. The reasons why salt is of advantage may be thus generally summarised:—1. Because it softens, moistens, and breaks up the soil, making a larger proportion available to nourish the roots of plants. 2. Because it absorbs moisture from the atmosphere, retains such moisture in the soil, and compensates for a deficiency of rain. 3. Because it purifies and decomposes all inactive matter and destroys noxious germs and ova of future insect pests. 4. Because it is good for renovating old pasture lands and making sour grasses sweet and palatable for cattle and sheep. 5. Because when sown as a top dressing in spring it strengthens the straw of cereals by setting free the requisite quantity of silica to nourish the stems." Mr. Findlater said care should be exercised as to where it should be applied; on some soils salt would be injurious. At Meningie salt applied to the pastures had a very beneficial result. The Chairman said he used salt on some grass, but it burnt it up.

BONEDUST.—The Chairman stated that he noticed that Dr. Voelcker, the well-known authority, had come to the following conclusions in regard to bonedust:—1. Bonedust made from solid bones, even when reduced to a fine powder, is less soluble in water, and acts more slowly on vegetation than much coarser bonedust made from porous or spongy bones. 2. Fresh bones impregnated with grease do not readily enter into decomposition, and are less valuable as a manure than bones from which most of the fat has been removed by boiling in an open copper. 3. Fat or bone grease has no fertilising value whatever, and as it retards the solution of bonedust in water, it is decidedly an objectionable constituent of fresh bones as far as the agriculturist is concerned. 4. Water dissolves much more phosphates of lime from rotten than from fresh bones. 5. During the putrefaction of bones soluble nitrogenous organic compounds and ammoniacal salts are produced from the gelatine contained in the bones. These compounds act powerfully and quickly as fertilising constituents, and are indirectly useful in greatly enhancing the solubility of bone phosphate in water. 6. Bonedust kept in a heap for three or four months heats and becomes more efficacious as a manure than bonedust applied to the land fresh from the mill. 7. High-pressure steam renders bones so brittle that they can easily be ground into a fine powder which is readily assimilated by plants. 8. Bonemeal prepared by high-pressure steam contains not much less nitrogen than ordinary bonedust, and as a manure is far more efficacious and valuable than the latter. 9. Placed in a heap with ashes or sand, and occasionally moistened with liquid manure or water, bone enters into putrefaction, and becomes a much more soluble and energetic manure than ordinary bonedust. Mr. Wynes said he was still of opinion that the oil or fat in fresh bones made the manure richer than that made from dry bones. Their experience was in favor of fresh bones. Some discussion ensued as to whether the dry bones were really cheaper and better than green bones, which became available for plant food more slowly, and lasted much longer.

EXHIBITS.—Mr. Buck showed plants of mustard 7ft. high, sown in March on light sandy soil, which had not been manured for three years. He also showed large Purple-top turnips, one measuring 20in. in circumference. He also tabled specimen of weed growing in the district.

VEGETABLE GROWING IN THE ORCHARD.—A discussion took place on this subject. The Chairman said great care must be exercised in digging, if vegetables are grown in the garden, in order not to destroy the roots of trees. Then such vegetables as mangolds were great robbers of the soil.

Lyrup, July 5.

Present—Messrs. A. Thornett (Chairman), D. J. Bennett, O. Klemm, T. Nolan, F. E. Chick, P. Brown, T. R. Brown, A. Pomeroy, W. Healy, A. Weaver, D. Thayne, E. Layton, R. W. Skelton, W. H. Wilson (Hon. Sec.), and four visitors.

ONIONS.—Mr. Pomeroy tabled good samples of James's Long-keeping onion.

QUESTION BOX.—The following questions were answered:—**Asparagus.**—Prepare land for asparagus by digging deep and working in plenty of well-rotted manure about three months before plants are to be set out. Make the surface very fine. **Hedges.**—To prevent boxthorn hedges from spreading at the roots, dig close by them and cut the suckers close to the stem. **Milk Yields.**—Difference of opinion existed as to how many cows one man can profitably attend to, and the quantity of milk per cow to give a profit. **Potatoes.**—Land for potatoes should be well worked three months before planting, and cultivated in the interval to destroy the rubbish. Plant in July.

3in. deep, and put manure in the drills. Lime.—Lime acts beneficially on clay land, and a good dressing once in six years is sufficient. Onions.—Climate not suitable for “pitting” onions. Stored in thin layers in a draught of air they will keep well. Vines.—Excrecences on vines are caused by bruises, and should be removed as soon as noticed. Vines will pay to irrigate in July, especially in dry winter. One winter irrigation is worth two in the spring or

Crystal Brook, July 2.

Present—Messrs. W. J. Venning (Chairman), W. Hamlyn, E. Dabinett, J. Forgon, W. Natt, G. Davidson, E. Pope, J. C. Symons, J. Chambers, J. F. Bryson, and G. Miell (Hon Sec).

OFFICERS.—Messrs. G. Davidson and J. C. Symon were elected Chairman and Vice-Chairman respectively, and Mr. G. Miell was re-elected Hon. Sec.

FIELD TRIAL.—It was decided to endeavor to arrange for a field trial of cultivating implements the day after one of the local shows.

TOBACCO.—The Hon. Sec. tabled specimen of Virginian tobacco grown in the district last season. He believed tobacco would do well in this locality.

Mount Pleasant, July 8.

Present—Messrs. G. Phillis (Chairman), W. M. Vigar, W. Lyddon, P. Miller, jun., J. McConnell, J. Maxwell, R. Godfree, J. A. Naismith, and H. A. Giles.

APPLES.—Mr. Phillis tabled nice samples of Cleopatra, Dunn's Seedling, and London Pippin apples, and stated that he always painted the trunk and the limbs as far up as he can reach with a mixture of lime and bluestone of thick consistency, and found the trees kept very healthy.

PLOUGHING AND FALLOWING.—A discussion on these subjects took place, the members being of opinion that sufficient attention was not paid to thorough ploughing, and that the use of skim ploughs would result in poorer crops. They also were of opinion that fallowing was not profitable in this district, the feed being of considerable value for stock.

Meadows, July 4.

Present—Messrs. J. Catt (Chairman), T. B. Brooks, W. Pearson, G. Rice, T. Griggs, and W. A. Sunman (Hon. Sec.).

“SOURSOPS.”—Mr. Rice wished to know how to get rid of this weed, which was overrunning his land. [In last few issues of *Journal of Agriculture and Industry* the treatment recommended has been published several times. Members should read the *Journal* closely.—GEN. SEC.]

DAIRY COWS.—The Hon. Sec. read a short paper to the following effect:—

There is no doubt that a herd of good dairy cows is a source of profitable employment where there is ample accommodation and provision for the animals. The principal thing is to breed up to a high standard, and this can only be done by mating a first-class bull of a good dairy breed and family with well-formed milk-producing cows. He preferred the Jersey cow crossed with a good dairy strain of Shorthorn bull, the progeny of which are good, hardy milkers, very quiet, and larger than the pure-bred Jerseys. He did not favor the Holstein cross nor the Ayrshire, which, although large, he considered were hard to milk, and gave a lesser quantity of milk of poorer quality than is yielded by the Jersey-Shorthorn cross. One of his Jersey-Shorthorns which came in a few days ago was giving 4galls. of milk daily, with a test of 4.4 butter fat. The dairyman should make it a practice to be in the yard at milking time, to make sure that the cows are milked dry and are kindly treated. Much loss will be occasioned through neglect of either of these matters.

Members generally expressed themselves in favor of the Shorthorn-Jersey cross.

Penola, June 11.

Present—Messrs. D. McKay (Chairman), F. Ockley, J. A. Riddoch, J. Fowler, W. R. Pounsett, E. A. Stoney, W. Miller, D. Balnaves, J. W. H. Sandiford, J. D. Wilson, and T. H. Artaud (Hon. Sec.).

SUGAR BEET.—A letter and pamphlet from Mr. F. Krichauff upon beet cultivation was received with thanks.

ANNUAL REPORT.—The Hon. Secretary read a very lengthy, critical, and statistical report upon the various local industries, and condition of the district for the past year. The prospects had greatly improved since the break up of the drought. A small co-operative store had been started at Coonawarra, and 1,600 acres of land had been taken up by various small co-operators for farming land on the Katnook and Glenroy estates. Although the land in the district is well suited for the growth of cereals, the area under cultivation of late has been limited, but there is evidence of considerable increase in the near future, as also in other farm crops. Owing to the drought the number of cattle, horses, sheep, pigs, and poultry had considerably decreased. For the same reason the output of cheese, butter, and honey had been lessened. The fruit industry conducted at the Coonawarra Fruit Colony had commenced to be reproductive during the last two years. Apples, peaches, apricots, plums, and grapes are chiefly produced, and these have been well selected with regard to local and export market requirements. At the Annual Conference of the South-Eastern Branches at Bordertown in 1897 there were forty excellent varieties of apples tabled from Coonawarra. Laudatory references were also made to the wine industry, which is rapidly becoming an important one in the district. A shipment of twelve hogsheads of claret to England resulted in an order for fifty more at once. Foxes are multiplying wonderfully, but the rabbits are decreasing in number.

OFFICERS.—Captain Fowler was elected Chairman, Mr. E. A. Stoney Vice-chairman, and Mr. T. H. Artaud re-elected Hon. Sec. for ensuing year. Thanks accorded to Hon. Sec. for his report, and to officers for services during past year.

Penola, June 22.

Present—Captain Fowler (Chairman), Dr F. Ockley, Messrs. W. Miller, J. D. Wilson, D. McKay, H. Ricketts, J. A. Riddoch, J. W. H. Sandiford, D. Balnaves, W. R. Pounsett, T. H. Artaud (Hon. Sec.), and a large number of farmers and others.

FIELD TRIAL.—This meeting took place at Dr. F. Ockley's farm, Naracoorte road, to witness a field trial of a Spalding-Robbins rotary disc plough, which did not appear to work well on the unsuitable soil. The members were entertained at luncheon by Dr. Ockley.

Penola, July 9.

Present—Captain Fowler (Chairman), Dr. F. Ockley, Messrs. W. Miller, D. Balnaves, J. W. H. Sandiford, E. J. Peake, E. A. Stoney, S. B. Worthington, and T. H. Artaud (Hon. Sec.).

RAINFALL.—For June, 4.51in.; for six months to June 30, 9.38in. At Coonawarra for June, 3.69in.

EXPERIMENTAL.—Hon. Secretary reported receipt and distribution for planting of trees of *Laurus camphora* (Camphor Laurel), from Central Bureau. Messrs. Balnaves and Miller stated that Red and White Kaffir corn had both grown well and had stood capably, but had failed to produce seed. [I cannot

tell why these plants failed to produce seed. The same complaint is made from many parts of the colony, and yet in numerous places the Red and the White Kaffir corn raised from seed taken from the same bag produced wonderfully large heads of good, large, and sound seed.—GEN. SEC.]

GAS LIME AND VINES.—Mr. Stoney wished to know whether gas lime would kill the night-feeding caterpillars, if it were placed around vines, without injury to the vines.—[Gas lime would kill the vines, and might hurt the caterpillars.—GEN. SEC.]

CROWS.—Mr. Stoney complained that crows were greatly damaging his apples. [This is a fresh charge against the crows. Is it possible that parrots are the culprits, and poor John Crow the "scapegoat"? Penola Branch would be pleased to have other Branches consider this question. If members do this they should be exceedingly careful to weigh the evidence for as well as against. The crow is black, but is not half as black as he is painted by reckless accusers.—GEN. SEC.]

Mount Gambier, July 9.

Present—Messrs. J. Umpherston (Chairman), G. G. Collins, D. Norman, W. Barrows, T. H. Williams, J. Bowd, J. Watson, J. C. Ruwolt, E. Lewis (Hon. Sec.), and one visitor.

STOCK DISEASES.—The Chairman, referring to discussion at previous meeting upon tuberculosis, said he thought the decrease of diseases amongst cattle in the district is attributable to the fact that landowners are not now importing cattle from Queensland. Mr. T. H. Williams said he had no doubt the outbreaks of pleuro-pneumonia during the last ten or twelve years had been caused by the introduction of Queensland cattle, but tuberculosis was in the district long before. It was due to breeding from diseased bulls and cows, and the decrease during late years was attributable to the greater care in breeding only from healthy animals.

OFFICERS.—Mr. J. Umpherston, (Chairman), Mr. J. Watson, (Vice-chairman), and Mr. E. Lewis (Hon. Sec.), were unanimously re-elected, and thanked for their past services.

WILLOWS.—Mr. Watson and Mr. Bowd advocated the transmission of all early potatoes to Adelaide in baskets, as they would carry better. Some members thought it would pay to grow osiers, whilst others were rather dubious upon the question.

CLIPPING HORSES.—The Hon. Secretary strongly recommended the clipping of horses. Mr. T. H. Williams said it was advisable in some cases, but the clipped animals must be well stabled, clothed, fed, and cared for. Most of the other members thought it best to leave the animals unclipped, for if they were kept in good condition that would keep their coats short. Clipping might do for town-stabled horses, but farm horses would not benefit, and it would give too much trouble.

HOMESTEAD MEETINGS.—Members resolved to meet occasionally at various farms and homesteads.

BULL.—It was mentioned that it had been decided to leave the Jersey bull in the hands of the present holder for another six months. Mr. Ruwoldt said he was feeding the animal up. He would have been in the district a year by next November. Members thought the Agricultural Department should leave him here till February or March.

DEATH OF HORSES.—Referring to the death of two horses rather unaccountably a few days back, Mr. Williams said the only conclusion he could arrive at was that they died from inflammation of the stomach and intestines, caused through eating a large quantity of partly-decayed grass food.

Strathalbyn, July 1.

Present—Mr. M. Rankine (Chairman), Hon. J. L. Stirling, Messrs. George Sissons, L. Dunn, W. M. Rankine, B. Smith, H. H. Butler, A. Rankine, W. J. Tucker, R. Watt, J. Cheriton (Hon. Sec.), and several visitors, including the Dairy Instructor (Mr. G. S. Thomson).

HINTS FOR THE FARM.—Paper on this subject read at previous meeting by Mr. Sissons was well discussed, the members generally approving of the contents of the paper.

DAIRYING.—The Dairy Instructor gave an interesting address on "Milk, Composition and Treatment of; Butter-making; Breeds of Dairy Cattle, their Treatment," &c. A number of questions were answered by Mr. Thomson, whose opinion that the Shorthorn was the best all-round cow was fully indorsed by those present.

Arden Vale, July 4.

Present—Messrs. A. Hannemann (Chairman), M. Eckert, M. Searle, C. Pearce, P. Starr, D. Liebich, A. W. Fricker, L. Warren, E. H. Warren (Hon. Sec.), and several visitors.

OFFICERS.—Messrs. A. Hannemann, M. Eckert, and E. H. Warren were re-elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year.

THE NATIVE PINE.—The Chairman called attention to the value of this tree (*Callitris robusta*), and expressed surprise that it was not planted more in the North. He thought the Forest Department would do well to raise the young plants for distribution. For fencing and buildings it was not equalled by any other tree, except perhaps by the Sugar gum. The trees are rather difficult to raise from seed, but young trees, 3in. or 4in. high, will readily transplant. The Bureau was devoting attention to the preservation of our indigenous fodder plants, and he thought he might well urge the claims of our useful timber trees to more attention. A visitor stated that he had been informed by one of the Mount Brown foresters that the seeds, if beaten out of the cones, sown broadcast on ploughed land, and then harrowed in, would germinate readily. Members agreed that the Native pine was one of our most useful and drought-resisting trees, and was worthy of more attention.

NEW PLOUGHS.—Mr. Pearce called attention to the favorable reports of the new rotary disc ploughs, and stated that the agents had informed him that the discs would last long enough to plough up 1,500 acres, and that the cost of renewal was only 15s. It was decided to ascertain further particulars concerning cost and capabilities of these ploughs.

Boothby, July 5.

Present—Messrs. J. T. Whyte (Chairman), J. A. Foulds, J. Bell, E. Bradley, M. Leonard, T. Sims, R. M. B. Whyte (Hon. Sec.), and twenty-three visitors.

WATER CONSERVATION.—Letter received from Conservator of Water, re cost of pipes for bringing water into the district, as suggested at previous meeting. A committee was appointed to obtain necessary guarantee to carry out the scheme.

DONATION.—Mr. G. L. Ware, of Cowell, presented a number of parcels of cereal seeds, imported by himself from America, and was accorded a vote of thanks for his valuable donation.

CULTIVATION.—Mr. Foulds read a short paper on the "Cultivation of the Soil." He pointed out that the object of cultivation was to bring the soil into

a fine state of division, as well as to destroy the weeds. They had all noticed that where wheel tracks cross a piece of barren red soil the wheel-powdered earth appears to fertilise the adjacent strip of soil, and he believed that if they could afford to crush red cloddy land to a fine tilth they would double its fertility. Sometimes they find virgin soil in a very fine state of division, especially where there is a heavy growth of mallee and teatree. For centuries the roots of these trees have been spreading in all directions, tearing apart and displacing the particles of earth, until it was in as fine a state of division as ashes. On such soil he had grown excellent crops by simply sowing the seed on top and harrowing it in. Spots of scrub land that have been burnt off in the distant past are nothing like so fertile, owing to the soil having set and the circulation of air being stopped. He thought the lesson to be learnt from this was that the soil should be broken down as fine as possible. Land breaks up best when damp.

CUTTING MALLEE.—Members agreed that it would pay to cut the mallee shoots each year on uncultivated land, as the grass would grow better, and it would be possible to burn and so kill the mallee in time.

HORSE COMPLAINTS.—Mr. Sims said he had lost a horse lately; it went lame, the foot swelled up, and the swelling extended to the head. The Chairman said there must have been something in the foot to cause this. He had cured a case of rick, which would sometimes result in death, by applying turps after fomenting the afflicted part. The best thing to do for a nail in the horse's foot is to cut it out clean, and immediately apply spirits of salts. A visitor recommended applying oakum and tar as soon as the nail is removed.

Inkerman, June 28.

Present—Messrs. S. Diprose (Chairman), T. Forrest, J. Sampson, E. M. Hewett, W. Board, D. Fraser, S. Wills, C. H. Daniel, R. Kennedy, and W. A. Hewett (Hon. Sec.).

CONGRESS.—Members suggested following subjects for discussion at Congress:—The advantage or otherwise of changing seed wheat from one part to another. Will the repeated application of superphosphate exhaust the land for wheat-growing purposes? What breed of cattle is most likely to thrive on our mallee lands?

KANGAROO GRASS.—Mr. Forrest spoke of the value of this grass, which was at one time plentiful, but had now disappeared from the district. He wished to know whether seed was obtainable anywhere. [Yes; at Adelaide seed shops, but owing to so many of the flowers failing to fertilise, the seed is expensive.—**GEN. SEC.**]

BUNT.—Bunt in wheat and how to prevent it was well discussed.

Onetree Hill, July 1.

Present—Messrs. J. Bowman (Chairman), A. Adams, F. Barrett, H. H. Blackham, G. Bowman, J. Hogarth, J. Flower, F. L. Ifould, W. Kelly, A. Thomas, and J. Clucas (Hon. Sec.).

THE HORSE.—Mr. W. Kelly read a short paper on this subject to the following effect:—After stating that there are several breeds of horses, including heavy and medium draught, he named Clydesdales as the chief favorite draught breed in this colony. He preferred the medium draught for farm work, as it is quicker, and better able than the heavy horse to endure the severe walking exercise. It should have a wide forehead, tapering gradually to the nose, not too thin.

The width from the eye to the under side of the jaw should be great, but narrowing gradually to the chin. Mild eyes invariably denote a good-tempered horse. The neck should have a good long rein; shoulders deep, well formed for the collar to fit on the chest, which should be wide to give full play to the lungs. The barrel should be round and well ribbed up, with a strong loin; hind quarters long and muscular, tail placed well up; thigh well developed and coming low down, because from this part most of the strength is exerted; arm strong and muscular; joints strong and well formed, and flat bone. With good care such a horse will do a lot of work, and look well at the end of a busy season on less food than a loose, flat-sided animal. It is always best to breed from the best all-round even-tempered mares; but the sire should always be better than the mare. If she is too heavy, get a little blood into her stock. The sire should also have a good temper.

SEED DRILLS.—Some discussion took place on the irregularities in the drilled crops, and it was thought that the manure was partly responsible for this.

"WASHES" IN WHEATFIELDS.—The washaways caused by the heavy rains in hilly country were stated to present a serious difficulty to the use of the binder. Harrowing was the only practicable remedy, but this would leave the soil in an unsatisfactory condition.

HARROWING GROWING CROP.—Members report that the use of the harrows or cultivator on the wheat crop was coming into favor, the work being done before rolling the crop. Putting the roller on after a short interval would again break the crust of soil, and thereby invigorate the growth of the young crop.

Port Broughton, July 4.

Present—Messrs. R. W. Bawden (Chairman), J. Bates, J. Barclay, J. Harford, W. Tonkin, G. Pattingale, I. Rayson, R. Storr, W. R. Whitaker, E. Dennis, B. Excell, and S. M. Bawden (Hon. Sec.).

STUMP-GATHERING AND SHOOT CUTTING.—Mr. Dennis read a paper on this subject to the following effect:—

Members of some Branches may think the question of the best time and way to gather mullee stumps and cut the shoots a very small matter, but to farmers in the scrub districts it is a serious matter, for this necessary work runs away with a lot of time. Unless the stumps are gathered up and removed, the various implements used in cultivating and harvesting the crop suffer injury. The stumps should all be cleared off the ground. For some years the Government offered a prize for a stone and stump gathering machine, but none was found good enough to justify the award of the prize, and he did not believe any machine can be made that will do the work cheaper or better than can be done by gathering by hand and carting to heaps near at hand. With two boys to pick up the stumps and throw them in heaps in a line, and a man to load a tip-dray and cart the stumps away, several acres can be got over in a few days. Then, however, comes the question—What shall we do with, perhaps, two or three hundred tons of stumps in the paddocks in heaps? They were too far from the market to be able to dispose of them as firewood.

For bush cutting there is no better implement than a broad axe, as the shoots must be cut as near to the stump as possible. A grubbing axe might be better for wire-bush, umbrella-bush, and wattle seedlings, as if cut below the surface and the roots cut by the plough, they will not make much growth the next year. He had cut the shoots on a good many acres during this year, raked them in heaps and burnt them before ploughing, but he still had 300 acres of crop on which he would have to cut the shoots. He sometimes wondered whether leaving the shoots did not protect the crop for a time from wind and frost, as he often noticed that round the shoots the crops are higher than further away. There was no doubt that the best way to clear the land was to fire the stubble, but for three years they had not had sufficient stubble to get a good burn. The best plan, generally, is to cut, rake up, and burn the shoots before ploughing, then gather the stumps together as soon as ploughing is finished. This must be done before a drill can be used, and is better done, even if the seed is broadcasted and harrowed in, as the implements will otherwise be injured, and a poor job made of the work.

Members present considered that the best way to clear the land of shoots and stumps was to cut and burn the shoots before ploughing, and after the land has been ploughed gather the stumps into small heaps and burn them, saving the ashes to distribute by means of the drill at the rate of about 3 cwt. per acre. They consider the axe the best implement for cutting shoots.

MANURING.—Members reported that the crops manured with English superphosphate were looking particularly well. Mr. Patingale said he had a crop that was a splendid illustration of the benefit of manuring. Every two or three chains he had drilled in a row without manure, and here the wheat was from 6 in. to 7 in. high, while the manured portion was 12 in. to 14 in. high, and in splendid condition.

Dowlingville, July 5.

Present—Messrs. R. A. Montgomery (Chairman), S. Tee, W. Walker, J. Burkin, T. Kenny, H. Crowell, J. Phelps, T. Illman, R. Foggo, G. Mason, F. Roberts, J. L. Broadbent (Hon. Sec.), and one visitor.

STABLE MANURE—Some discussion took place in reference to Gen. Sec.'s recommendations for making best use of stable manure. Mr. Phelps considered they would entail too much labor, but Mr. Montgomery thought the value of the fertilising ingredients which would be saved by such treatment would more than pay for the labor.

SEED DRILLS.—A discussion took place on the work of the seed drills. Mr. Foggo said he found the drills sowed the grain much more regularly when the seed was sown thickly, and he attributed the unevenness when sowing thin to the jerking of the wheel. The Chairman found fault with the indiarubber tubing, and members agreed that the telescope tubing of the drill used by Mr. Foggo was the best. A drill fixed to a plough is doing fair work in the district.

Millicent, July 2.

Present—Messrs. R. Campbell (Chairman), H. Hart, H. Oberlander, H. A. Stewart, B. Varcoc, and E. J. Harris (Hon. Sec.).

CROPS AND SEASONS.—Members reported $4\frac{1}{2}$ in. to $5\frac{1}{2}$ in. rainfall for June in various parts of district. Mr. Hart stated that rye on a patch of poor white sand manured with bonedust three years ago was looking grand. Mr. Varcoc reported that about fifteen acres of crop had been completely destroyed by magpies and crows, being attacked directly it appeared above ground. It was reported that the area sown this season is the largest on record, and that the crops were looking very well.

SCAB ON POTATOES.—In reply to inquiry as to treatment for scab on potatoes, the Chairman said there were three remedies mentioned, viz., corrosive sublimate, formalin, and bluestone. The first is dangerous, the second expensive, and the last is cheap and effective. Sulphate of copper (bluestone) is used by dissolving 7 ozs. in a gallon of water and adding 18 galls. The potatoes should be dipped for five minutes and dried before planting. The last is undoubtedly the cheapest, and, as it is a proved fungicide much in use, will probably answer just as well for potatoes as the more expensive articles.

OFFICERS.—Messrs. R. Campbell and E. J. Harris were re-elected Chairman and Hon. Sec. respectively for ensuing year.

FERTILISERS.—Mr. Stuckey called attention to the fact that most farmers were using fertilisers directly to corn, and in doing so were not getting the best value from them. If the fertilisers were applied to a root or green crop, which should be fed off and then ploughed in, the return from the corn crop following would be more satisfactory in every way.

Redhill, July 5.

Present—Messrs. A. A. Robertson, (Chairman), R. T. Nicholls, R. B. P. Bailey, R. H. Siviour, D. Steele, D. Lithgow, G. Wheaton, and T. McDonald (Hon. Sec.).

FERTILISERS.—Some discussion took place on the question of whether the continued use of commercial fertilisers would not impoverish the soil. Opinions being divided on the subject, members would like the matter discussed at Congress.

Yorketown, July 9.

Present—Messrs. J. Koth (Chairman), C. Domaschenz, A. Jung, J. Latty, T. H. Thomas, and J. Davey (Hon. Sec.).

OFFICERS.—Messrs. J. Koth and J. Davey were re-elected Chairman and Hon. Sec. respectively for ensuing year. The Hon. Sec. reported that few meetings were held during the past year owing to non-attendance of so many of the members, and appealed to them to attend regularly.

WHEAT PEST.—Considerable discussion took place on the “grub” which is creating such havoc in the wheat crops. Mr. Jung was afraid they could not be successfully combated in the grub stage, as they never appear above the surface, but work about 1in. or 2in. underground. He thought the only thing that would do any good would be the use of some chemical, which, by being worked into the soil, would kill them. Numbers could, however, be destroyed while in the beetle stage by means of nets when they congregate round trees and bushes at sundown about November. The Hon. Secretary asked whether it would be possible to kill them when in the beetle stage by poisoning their food. Mr. Jung said he had never seen the beetles feeding, and did not know whether they fed at all during that stage of their existence. He believed, from his observations and experiments, that the insects were two years in going through their various stages. Mr. Domaschenz said he was trying some experiments, and would report results.

Pine Forest, July 5.

Present—Messrs. W. H. Jettner (Chairman), J. St. J. Mudge, W. Burgess, J. Phillis, A. Mudge, A. Inkster, D. F. Kennedy, F. Inglis, R. Barr, jun. (Hon. Sec.), and two visitors.

FIELD TRIAL AND SHOW.—Matters in connection with the Bureau Field Trial Society's trial of cultivating implements to be held at Bute, on August 3, and the combined Branch show at Port Broughton, on September 21, were dealt with.

Richman's Creek, July 4.

Present—Messrs. A. Knauerhase (in chair), J. J. Scarle, M. Hender, J. M. Kelly, P. J. O'Donohue, A. Nicholson, J. A. Knox, J. J. Gebert, W. Rogers, J. McSkimming, W. J. Wright, E. Roberts, J. McColl (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year eight meetings were held, with an average attendance of over nine members. The long-continued drought had the effect of lowering the average attendance and interfering with the work of the Branch. Some difficulty was experienced in reference to the keep of their Ayrshire bull, but this was got over by the different members taking charge of him in turn. He regretted to say the services of the bull were not utilised by the public.

SPARROWS AND PARROTS.—Mr. Knauerhase called attention to the rapid increase of sparrows in the district. They did a lot of damage to newly-sown crops. Mr. Hender said he had tried poisoning, first giving them good grain for a few days, then poisoned wheat. He picked up more than a score of dead birds as the result. Mr. Gebert found the ringneck parrots were much worse than the sparrows, being especially destructive to fruit trees, picking off most of the young buds. Mr. Wright said they should make a united effort to destroy the sparrows, especially during the breeding season. Members agreed that the sparrows were rapidly increasing, and that unless stringent measures were taken would be a very serious nuisance. They considered that the parrots could be got rid of by shooting.

Cherry Gardens, July 12.

Present—Messrs. E. Wright (Chairman), F. Jacobs, J. Lewis, C. Lewis, J. Choate, G. Brumby, J. Mackereth, G. Hicks, W. Nicholls, R. Gibbins, C. Ricks (Hon. Sec.), and four visitors.

EARLY GOOSEBERRIES.—Mr. C. Lewis tabled samples of gooseberries. Members reported that quite a number of apple trees had blossomed, and now bore young fruit. They attributed this out of season bearing to the rain coming when the soil was warm, following on a dry season.

STANDARD WEIGHT OF CHAFF.—It was decided to ask that the question of fixing a standard weight for the bag of chaff be discussed at Congress.

INTENSE CULTURE.—The Hon. Sec. read paper on "Intense Culture as Applied to the Farm and Dairy."

Swan Reach, June 30.

Present - Messrs. P. A. Hassé (Chairman), A. Hohnberg, G. Grieger, J. O. J. Kohake, F. Fisher, F. Brecht, and P. A. Beck (Hon. Sec.).

SUBJECTS.—Resolved, that in the absence of subjects for discussion promoted by members of this Branch, the Hon. Secretary will select subjects from the *Journal of Agriculture and Industry*, at each meeting. Several members mentioned that the articles in that journal and subjects treated upon by other Branches of the Bureau were very suitable to the circumstances of the Swan Reach district.

WINTER-PROUD CROPS.—Mr. A. Hohnberg said some of his self-sown crops were growing very rankly, and he thought it would be advantageous to both crops and animals if he put some sheep to graze upon them. Mr. Kohnke concurred, and stated that he had found that such crops when fed down by sheep turned out better than similar crops alongside, where no sheep had been put on.

Minlaton, July 16.

Present—Messrs. James Martin (Chairman), M. Twartz, A. McKenzie, H. Boundy, J. H. Ford, S. Vanstone, J. Bennett, John Anderson, J. McKenzie, James Anderson, R. Higgins, J. Fletcher, D. G. Teichelmann, W. Correll, Joseph Correll (Hon. Sec.), and one visitor.

WHEAT GRUBS.—The Hon. Secretary referred to damage to wheat crop and to grass by underground grubs, which appeared to him to be very similar to the English cockchafer grub. He believed he was within the mark in saying that hundreds of acres of crop had already been destroyed by this grub, which

remains underground, eating the roots of the plants. They were more prevalent in the richer and darker soils. Most of the members reported having patches of their crops destroyed by this insect, the pest being worse than they had ever known it before. Mr. W. Correll believed the only way to treat with them was to catch and destroy the beetles before they deposit their eggs. He noticed they clustered round trees and other objects about October and November, and it should be an easy matter to destroy them. This year they had spread on to the red soils, where they had never been found before. After further discussion it was resolved that the Central Bureau be requested to endeavor to have an entomologist sent over to study the habits of the insect, and to try to discover a practical method of coping with the pest.

COMMERCIAL FERTILISERS.—Mr. Boundy referred to the fact that many of the bags of phosphatic manures being sold were short weight, and the agents were now endeavoring to get the farmers to agree to accept the manures at the English exporter's weights. He strongly advised farmers not to accept other than the actual weight. The Hon. Secretary said some of these manures contained too much sulphuric acid, which destroyed the bags. This acid was very cheap, and of no value itself as a fertiliser for wheat, there being quite sufficient of it in the soil, and the buyers should insist on only sufficient being used in the manures.

OFFICERS.—Mr. H. Boundy was elected Chairman, Messrs. J. McKenzie and J. H. Ford Vice-chairmen, and Mr. J. Correll was re-elected Hon. Sec.

Mount Compass, July 12.

Present—Messrs. M. Jacobs (Chairman), S. Arthur, W. Gowling, C. S. Hancock, A. J. Hancock, R. Peters, F. Slater, W. Wright, H. McKinlay (Hon. Sec.), and seven visitors.

OFFICERS.—Messrs. M. Jacobs, Chairman; A. J. Hancock, Vice-chairman; H. McKinlay, Hon. Sec., and W. Gowling, Assistant Hon. Sec., were elected for ensuing year.

SEASONABLE WORK.—Plant deciduous fruit trees at once, but leave oranges, lemons, &c., till danger from night frosts is over. Sow celery in hot beds, and in the open beds sow onions, carrots, parsnips, and cabbage.

WEEDS.—Mr. Jacobs read the following paper:—

Nothing looks worse than a garden growing weeds, and in our district, where we do our gardening in the summer, they have every chance to grow. Most experienced gardeners will tell you to keep down weeds at any cost. But in our district, where we grow our produce in the summer and weeds are so easily killed, is it wise to go to the expense of keeping them down in the winter? It is a matter I do not understand, but I wish to lay a few ideas before you, and find out where I am wrong. The worst weed we have is sorrel, which should be killed, cost what it will. But such weeds as chicken weed, fat hen, sow thistle, and swamp grass—are they beneficial? My reasons for thinking they are not are these:—The land is always under crop. It receives no benefit from the sun and frosts during the winter months, and only a small portion of the particles taken from the ground and returned when we dig the weeds in become available for that season, and by the following season the greater part has been washed away by the rains if we have a late crop and get early rains. The seeds having been allowed to mature the previous year it is very difficult to keep the weeds down, and the crop is checked in consequence. Pesty lands are very rich in humus, and that is one of the greatest benefits derived from green manure: they would not pay their way in that respect. Paths and drains should never be allowed to mature weeds, as the seed soon spreads. It is well to remember the old proverb "One year seed, seven years weeds."

Quoting from an essay by another writer, Mr. Jacobs remarked that weeds are the insidious enemies of agriculture, and that for want of attention at the proper time sixpences may be saved at the cost of several pounds in weeding later on. By unremitting attention to weeds in autumn the cost of keeping a clean field is comparatively easy.

Kanmantoo, July 1.

Present—Messrs. J. Downing (in chair), J. Hair, Edward Downing, J. Mullins, A. D. Hair, and W. G. Mills (Hon. Sec.).

SEEDING.—*Re* quantity of seed wheat to be sown per acre, Mr. Mullins thought 1 bush. to 1½ bush. not too much, but other members considered ½ bush. is sufficient if sown early on well-prepared land. One member said one plant to the square foot would be sufficient for a wheat crop. Mr. J. J. Hair said he had sown 1½ bush. of oats per acre, and the crop was much too thick.

CAPE MARIGOLD.—Mr. Mullins said that the so-called “dandelion,” or Cape marigold (*Cryptostemma calandulacea*), would greatly decrease any cereal crop if allowed to grow amongst it. This weed is a great drawback to thin seeding. Mr. E. Downing said he had proved it to make the best of hay for milch cows. He believed it to be good also for horses and cows when green, but not so good for sheep.

CHEMICAL FERTILISERS.—Some members had heard that if these fertilisers are once used they must be always used, because they take so much out of the soil that it does not produce even grass so abundantly as before. Members would be glad to know if this is true. [By adding a plant-food that is deficient in the soil it enables the plant to make use of other plant-constituents that are more abundant there, and thus heavier and better crops are produced. Thus, if phosphoric acid is deficient, but potash, nitrogen, &c., are in sufficient quantity, you cannot obtain a really good crop of wheat, &c., until the deficiency of phosphoric acid is added (perhaps in the form of superphosphate, or bonedust, or Thomas phosphate). But the increased crop will also take out some of the potash and nitrogen, and in time these may become deficient. If good crops are still desired it will be necessary then to make good the deficiency of potash, nitrogen, &c., which has been brought about by taking off previous heavy crops.—GEN. SEC.].

WEEVILS IN APPLES.—Mr. Downing said he had found that the weevils which had attacked his stored apples had proceeded from a bag of maize which was stored in the same place.

OFFICERS.—Resignation of Mr. W. G. Mills as Hon. Sec. accepted with regret, and Mr. Arthur D. Hair elected in his place.

Lucindale, July 2.

Present—Messrs. E. Feuerheerd (Chairman), B. Feuerheerd, E. Hall, S. Tavender, J. Bourne, A. Matheson, A. Dow, E. Dutton, A. Lobban, H. J. Deeble (Hon. Sec.), and one visitor.

INSECT PESTS.—Mr. Tavender showed red spider on plum cutting, and aphids on orange leaves. Mr. Hall showed specimen of borers which were destroying one of his apple trees.

BONEDUST AS MANURE.—The Chairman read opinions of Dr. Voelcker on bonedust as a manure; also remarks by Mr. A. N. Pearson, of Victoria, which appeared in the *Australasian*, as follows:—

Bones may be dissolved in the lye from plant ashes, in crude potashes, in caustic potash, caustic soda, or with caustic lime. There are various ways of using these materials. The simplest plan is to pack the bones layer by layer, with wood ashes, in a barrel, and to keep the mixture moistened for some months.

A better plan is to boil them in potash lye. If freshly-burnt wood ashes be placed in a cask with a bung at the bottom, and water be poured on the ashes sufficient to cover them, and this water be then drawn off at the bottom, the liquor or lye that runs out will be found strongly alkaline. This is “potash lye,” and may be used for dissolving bones. The bones may be placed in a big iron or copper boiler, and the lye poured on them. If boiled long enough most bones thus treated become reduced to a muddy liquid, which may be poured on to a compost heap, or may be boiled down to a dry mass and powdered.

Caustic potash (which is the liquor obtained by passing lye through quick lime) has such a powerful action that bones, when allowed to remain for a week in a strong solution of it, become completely reduced, so that if water be added to the muddy mass so obtained there will result simply a liquid in which the earthy matter of the bones will float as a fine powder.

The bones may also be reduced in wooden vats or even trenches cut in the ground and lined with boards. For this purpose materials should be taken in the following proportions:—One ton bones, 1 ton wood ashes, 3cwts. quicklime, and 250galls. of water. The lime should be slaked with a part of the water, and then mixed with the ashes. The mixed powder is to be then placed in the trench, layer by layer, with half a ton of bones, and the whole then moistened. It is left to itself for some time, and when the bones have become so soft that they can be rubbed down between the fingers, the mixture is taken out and replaced, layer by layer, with the other half ton of bones; and the whole, having been watered, is left to ferment until the new bones have become thoroughly softened.

Bones may also be softened by mixing in heaps with quick lime and loam, thus:—A layer 6in. deep of bones, on this a layer about 3in deep of lime, then a layer about 4in. deep of loam, and so on, repeating until the heap is made up to a convenient height, when it is to be covered up with a thick layer of earth. Holes are then to be bored into the heap from the top, and water poured in to slack the lime. The mass will become hot and remain so for two or three months, after which the bones will be found very friable, and the whole heap may be mixed up and is ready for the ground.

PRUNING.—Members adjourned to the garden where Mr. B. Feuerheerdt gave practical demonstrations in pruning vines and fruit trees, several visitors being present.

Maitland, July 2.

Present—Messrs. H. Pitcher (Chairman), J. W. Shannon, T. Bowman, H. R. Wundersitz, H. Bawden, A. Jarrett, C. F. G. Heinrich, W. Wilson, and C. W. Wood (Hon. Sec.).

DISEASE OF APRICOTS—Considerable discussion took place on disease causing death of apricot trees in the district, and the opinion was come to that it was a hopeless case.

ANNUAL REPORT.—The Hon. Sec.'s annual report showed that during the year ten meetings were held with an average attendance of nearly nine members. He regretted so few visitors attended their meetings. Four practical papers were read and discussed, and a number of practical subjects also dealt with. Mr. Pitcher was elected Chairman, and Mr. C. W. Wood re-elected Hon. Sec.

MANURES.—Members reported that various substances had been mixed with English superphosphate to make it run freely in the drill, some of which would probably have an injurious effect on the fertiliser. It was generally considered that super-guano was the best thing to use, and that it would not affect the super.

Clare, June 8.

Present—Messrs. J. Christison (Chairman), W. Kelly, W. Birks, J. Treleaven, R. E. H. Hope, H. Carter, H. Miller, and W. Kimber (Hon. Sec.).

CODLIN MOTH.—Considerable discussion on this subject took place, and it was decided to hold a meeting with a view to decide whether some combined action could be taken to eradicate the pest from the few gardens in which it has appeared in this district. It was stated that the brown apple moth, which had been known here for several years, was mistaken by some growers for the codlin moth. Members thought some attention should be paid to the introduction of natural enemies of the moth, and reference was made to the protection and introduction of bats into California to check this pest.

FRUIT.—Mr. Treleaven tabled sample of pear thought to be *L'Inconnue*, still very green, but likely to become a nice dessert fruit; also one pear, name

unknown. Members generally stated they were rather disappointed with the Rome Beauty apple. While it was a good keeper, it was not equal to their expectations.

EAGLEHAWKS.—Mr. Carter stated that the eaglehawks were playing sad havoc with his lambs, and he had not been at all successful in poisoning the birds, neither could he get within shooting distance. Members thought there should be no difficulty in poisoning the birds, as if powdered strychnine is introduced into cuts made in freshly-killed lambs, the poison soon permeates through the whole body, and as the hawks return to their latest victims they are easily destroyed. Mr. Hope stated that by this means Mr. W. Murray had found eighty five hawks dead, and at Canowie over sixty were poisoned.

HON. SECRETARY.—Mr. Kimber tendered his resignation as Hon. Sec.

Koolunga, June 30.

Present—Messrs. T. B. Butcher (Chairman), J. Sandow, J. Button, J. Butterfield, J. Jones, R. H. Buchanan, R. Jackson, J. Freeman, E. J. Shipway, W. J. Jose, W. T. Cooper, R. Palmer, R. Lawry, and G. Pennyfield (Hon. Sec.), and two visitors.

SOURSOPS.—Mr. Buchanan referred to spread of this weed, and urged members to do all in their power to prevent it from spreading further and becoming a nuisance.

QUESTION BOX.—A number of questions were dealt with, and the following opinions were elicited:—It is best to sow and work cloddy land when wet. It is not advisable here to sow lucern with wheat or barley. Lampblack and oil or red ochre and oil are good compositions for branding sheep, and should be mixed a few days before using. Lambs should be tailed when about six weeks old. Weakly vegetable plants and want of moisture conduce to blight. A spur on a hen is objectionable in a show; one of the principal points in judging an Indian Game hen is the color. Kerosine and lard or carbolic oil are good preparations for sore shoulders on horses. Binding and heading wheat has not been tried sufficiently in this district to decide on the value of the practice.

Angaston, July 16.

Present—Messrs. R. Player (Chairman), W. Sage, E. Thamm, W. Sibley, S. O. Smith, A. Friend, J. E. Swann, A. Sibley, F. Salter, A. Salter, J. Vaughan, P. Radford, and E. S. Matthews (Hon. Sec.).

ANALYSES OF SOILS AND FERTILISERS.—It was resolved that the Central Bureau be asked to consider the advisableness of getting a vote of the whole of the Branches on the question of asking the Government to abolish the charges for analysing soils and fertilisers, as is done in Victoria.

FARM MANAGEMENT.—Mr. Sibley read a paper, giving his ideas as to how he would manage a farm—if he had one—to the following effect:—

First he would endeavor to manage it systematically, because want of system is the cause of great loss and vexation. He would combine grazing with cultivation, and divide the farm into fields of convenient size. Crop one season and rest the land the next one. Overstocking is a fault that many farmers and squatters have fallen into, and this has been amply proved by the experience of the past two years. It is a great mistake to overstock when the grass is young—it would be better to keep fewer animals, and purchase some store sheep to eat the surplus feed in spring time. In regard to horses, he would secure active, powerful animals, and stable them for at least two or three weeks before putting them to work, as they often pick up a lot of sand and rubbish in the paddock, and if put to work at once this would probably be injurious to them. The stabling should be good, and proof against water dripping on the horses' backs, and should be so arranged to allow of feeding from the front, with the chaff

store and haystacks in a convenient position, to save labor and time and prevent waste. Two or three lighter horses should be kept for saddle and trap purposes; but, as these are not likely to be constantly in work, there is not so much need to stable them. No farm is complete without a few good cows, which must be well fed, kindly treated, and provided with shelter. Sheep should be kept on every farm, to keep down weeds and to furnish meat, as well as in some cases wool; but care should be taken to secure young animals, and never to overstock. The skins of the slaughtered sheep should be carefully stretched and dried, as they are of value. Keep good breeds of egg-producing fowls, and do not keep them until they are too old for profit. Breeding birds for table purposes and for sale would pay. Pigs are profitable when well bred, well fed, and well attended to. They will utilise skim milk and waste food, and can be fattened upon grain, pulse, &c., grown for them upon the farm. Fences should be strong, and always kept in good order. Sheds should be provided for all implements, &c. If roofed with iron, a considerable quantity of water can be collected and stored. All implements should be cleaned, oiled, and painted (if necessary) when put away after the season for their use is over. Whenever there is a good season large stacks of hay and straw should be got in, and well protected against wet. Also save the whole of the chaff from the wheat. Strict accounts should be kept of all transactions, whether monetary or practical, conducted in connection with the farm. Unless the farmer keeps accounts of each crop and every transaction he cannot tell whether they are profitable or otherwise.

Tatiara, July 2.

Present—Messrs. G. Ferguson (Chairman), W. Montague, D. Makin, R. Scown, Thomas Stanton, H. Killmier, and W. E. Fisher (Hon. Sec.).

FRUIT PESTS.—It was decided to ask the Minister of Agriculture to appoint the Customs officers to inspect all fruit arriving by train to prevent the introduction of infested fruit.

Lyndoch, July 1.

Present—Messrs. R. Ross (Chairman), W. Rushall, jun., R. H. Payne, W. J. Lawes, S. Sage, R. Lovricidge, and J. Mitchell (Hon. Sec.).

FRUIT TREES.—Considerable discussion took place on pruning and treatment of fruit trees, and the following conclusions were arrived at:—Apricot: Plant good trees with stems *not more* than 2ft. 6in. high, and prune for shape. Cut the tree well back each succeeding year to cause growth of fruit buds. Apples: After shaping the tree do not prune back too hard. Fruit-bearing will cause the branches to open out. Peach: This is the easiest tree to prune to get good fruit. Neglect to prune will lead to unfruitfulness in a few years. The greatest trouble with this tree is keeping down the aphids. Bordeaux mixture poured round the roots has been found effectual in preventing their ravages. Spray the branches with tobacco water or kerosene emulsion. Plum: Only prune and top lightly; hard pruning is a mistake. Citrus trees: Never top. Thinning only is required unless a new top is wanted on an old tree. Irrigation or a well-drained moist soil is required for these fruits. Woolly aphids on apple trees can be prevented by using only blight-proof stocks. Systematic treatment with kerosene emulsion will check this pest.

Pyap, July 15.

Present—Messrs. G. A. Clarke (Chairman), C. Billelt, K. F. Huselins, W. Axon, T. Smith, E. Robinson, T. Teale, A. J. Brocklehurst, B. T. H. Cox, J. Harrington, W. C. Rodgers (Hon. Sec.), and two visitors.

PRUNING.—Considerable discussion took place on the various methods of pruning of fruit trees.

SORGHUM FOR SEED.—Some of the members are of opinion for seed purposes sorghum should be cut when about 3ft. 6in. high, and allowed to grow then to seed.

IMPROVED GUERNSEY CARROT. — Mr. Teale reported favorably of this carrot. It grew faster than any other he had tried, taking about three months only to mature. It produces very few leaves, but a good root.

EXHIBITS.—Mr Clarke tabled heads of Red Kaffir corn. Seed was sown in November, and the plants reach 5ft. 6in. in height. Some of the heads failed to mature seed. Mr. Brocklehurst said he had seen it stated that too much water when the seeds were forming caused them to fail to mature.

Port Lincoln, July 15.

Present—Messrs. S. Valentine (Chairman), J. P. Barraud, W. E. Goode, J. Telfer, J. O'Shanahan, R. Puckridge, W. Laidlaw, J. Anderson (Hon. Sec.), and several visitors.

FIELD TRIAL.—It was decided to arrange for a field trial of the new rotary disc ploughs.

BROADLEAF MUSTARD —The Chairman showed sample of Bloomsdale Broadleaf mustard, originally introduced by the Bureau. He had been growing this for three or four years, and strongly recommended it as a green fodder. The plant shown was fully 30in. high, and grown without any special cultivation.

POULTRY.—Mr. O'Shanahan read a short paper on this subject. South Australia reaped considerable benefit from the keeping of poultry, as, besides the local demand for eggs and poultry, the value of eggs exported amounted to £50,000 per annum. In keeping poultry they should first decide whether they intend to keep purely laying fowls or fowls for eggs and table purposes. Then purchase some good stock birds of pure breed, and get rid of the old "barn door" fowls which have inbred for generations. For laying birds select the Leghorn, Andalusian, or Black Spanish. The two former are non-sitters, light, hardy, active birds, and hard to keep within enclosures. For table and laying combined the Langshan, Indian Game, Plymouth Rock, and Minorca are famous. If cross-breeding is gone in for never go beyond the first cross. Keep only as many birds as can be fed in a rational manner, and bear in mind that the Leghorn fowl requires much less feed than the Langshan. Give warm food in morning and hard grain at night, house them properly, and they will be a source of profit and pleasure. Mr. Puckridge disagreed with the condemnation of the common fowl. If these got as much care and attention as is given to fancy breeds they would do equally as well. The Hon. Secretary doubted whether poultry would ever pay as a by-product, when the damage to garden and wheat crops was considered with the low price realised for eggs in an ordinary season. Poultry farms in suitable localities close to a ready market for both poultry and eggs would no doubt pay if properly managed.

Balaklava, July 16.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, A. Manley, J. Vivian, G. Reid, C. H. Reid, E. Roberts, J. Willmott, A. Hildebrand, W. H. Thompson, and E. M. Sage (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary reported that during the year ten meetings had been held, the average attendance being nine. Four papers were read and discussed during the year.

MANURES.—The Hon. Secretary reported having inspected crop drilled in with super guano. The crop came up all right, but was dying off in the rows in places. For 1yd. or more, in some parts, there was not a single plant left. The land was fallowed and had not been cropped for several years. Mr. Roberts stated he got the same results with vegetables from bonedust as from superphosphate. Mr. Manley considered it would pay better, when a man owns the land he is farming, to use bonedust than super, as the effects of the former last much longer. Mr. Sage thought it better to use bone-phosphate, even on freehold land, as the money is returned with profit much quicker. Members wished to know why it was that English super destroyed the bags so much, compared with colonial super. [Probably because an excess of sulphuric acid is used in the manufacture of English super.—GEN. SEC.]. The Hon. Secretary read an extract from the *British Australian* on the necessity for phosphoric acid manuring. It was pointed out that all soils contain phosphoric acid, but mostly in a form not easily taken up by plants, and even in soils rich in phosphoric acid the quantity that becomes available each day for the roots is small; so small, indeed, that it only suffices for an average crop in favorable seasons. If it does not rain for a fortnight the natural available supply runs short and the plants stop growing for want of phosphoric acid, and when the next rain comes they are ready for more than the earth can give them. It is therefore necessary to be liberal with phosphoric acid. It should be given to every crop in abundance, so that there is always a surplus in the soil. Some of the members thought it was moisture more than manure that their soils wanted. Mr. C. H. Reid said he cannot get as good crops now from new land as formerly. Members thought one reason for this was that less timber was burnt on the land than formerly.

SALTBUSH.—Mr. Roberts tabled specimens of saltbushes growing on his land. His stock feed on them whenever they get an opportunity.

Hartley, July 15.

Present—Messrs. C. Harvey (Chairman), T. Jaensch, A. Dalton, A. Thiele, H. Reimers W. Klenke, W. Kutzer, J. Stanton, and H. Lehmann.

HON. SECRETARY.—Mr. H. Lehmann was appointed Hon. Secretary in place of Mr. J. Ferris, jun., who resigned.

HORSE-BREEDING.—A discussion on this subject took place. Mr. Dalton referred to the handling of stallions; he considered they were often allowed too much liberty in the yards. Mr. Stanton thought they should have a well-ventilated stall with plenty bedding. Mr. Klenke agreed, and thought the stallion should be given exercise every day. The selection and treatment of mares was also dealt with.

Kadina, July 7.

Present—Messrs. T. M. Rendell (Chairman), G. E. Putland, S. Small, T. Jones, H. Johnson, M. Quinn, J. M. Inglis, D. Taylor, and J. W. Taylor (Hon. Sec.)

DAIRY CATTLE.—Mr. G. E. Putland read a paper upon "The Best Breed of Dairying Cattle." The following is a very short abstract:—

Although he had been connected with dairying during nearly the whole of his lifetime, he had never had anything to do with pure-bred cattle as milkers, and did not pose as a specialist. He had not found half-bred Jerseys much better than ordinary cows. This may have been due to the mothers of such cows having been of an inferior milking character, because some people had pointed out really good milkers which had descended from mothers of equally good

character. From all sources of information he had come to the conclusion that the majority favored the Ayrshires for dairy purposes, as they are considered the hardier breed by nearly three to one who favor the Jerseys. After seeing the Ayrshires at the Royal Agricultural Show in Adelaide he felt a preference for them, and was convinced that the calves were much larger than those of the Jersey. He had noted that several persons were much in favor of a strain of Devon in their milk cows. Devons, in his opinion, are best suited for beef to be exported in the freezing chambers, are fine in the bone, and keep condition better than other breeds. Where people pay a big price for pure-bred cattle, they rear every calf irrespective of milking character, and he had never known of any pure-bred cow taking the prize in Adelaide Show for best milk cow. In Victoria, in 1897 he thought, an Ayrshire took the prize in a two-days' test, making 17lbs. butter per week; but he had known mongrel cows which gave 18lbs. and 20lbs. butter per week, and had made 12lbs. himself from the milk of a cow of which it would be difficult to tell the origin and breed, but in some cases there had been a good strain of Durham or Devon in them. He thought an Ayrshire and Jersey cross would give good results, but was satisfied that there were mongrel cows in the colony that were quite as good or better milkers than the pure-breeds. The "Illawarra," or "South-coast" breed of dairy cows in New South Wales was really founded upon the milking type of the old Durham. The Dairy Instructor (Mr. G. S. Thomson) was of opinion that the best dairy cows for South Australia would be a Shorthorn and Ayrshire cross. Professor Lowrie seemed to favor the Jerseys, but his own opinion was that, if left to find their own feed, as the majority of our mongrel cows have to do, the Jerseys would in a few years be little better than goats. It is not safe to judge the merits of a cow upon one season's results. He had known of several instances where cows had given quite double the quantity of butter one year as compared with the yield of another year. He was fully convinced that if only the heifers from the best cows were kept for breeding, and only bulls from well-known milk-yielding cows used for stud purposes, the quality of the dairy herd would be greatly improved.

Mr. Johnson said he thought condition had much to do with the quantity and quality of milk. He had a cow which never gave him more than 6lbs. butter per week, but when he sold her to a man two miles away she gave 10lbs. a week. Mr. Quinn said his experience was that those who provided shelter for their cows obtained best results. The Chairman said results depended very much upon what the cows put through their mouths.

Narridy, June 18.

Present—Messrs. A. McDonald (Chairman), J. C. Myatt, C. F. Smart, H. Nicholls, J. Liddle, W. J. Martin, P. Beckman, and J. Darley (Hon. Sec.).

FIELD TRIAL.—Members favored holding a field trial of cultivating implements in connection with the Bureau Field Trial Society, but considered special attention should be paid to stump jumping implements, being of opinion that the stump-jump plough is the best in any class of land.

SELF-SOWN HAY CROPS.—Mr. Nicholls initiated a discussion on the best time to cut self-sown crops of wild oats. If cut early their horses will almost starve before they will touch the hay, whereas if left until in seed they relish it, and fatten quickly. There was apparently something distasteful in the oats cut early, and he would like the opinions of members of other Branches on the subject. Last season he allowed the crop to lie for a day before putting it together, and he believed it was the better for it, though his horses did not eat it very readily. Mr. Myatt believed the addition of a little salt would improve such hay. Mr. Beckmann found that wild oaten hay cut when almost dry was more readily eaten by horses.

Forest Range, July 23.

Present—Messrs. J. Vickers (Chairman), J. Green, G. Monks, J. Caldwell, A. Green, J. Sharpe, J. G. Rogers, R. E. Townsend, R. Hackett (Hon. Sec.), and four visitors, including Mr. G. Jeffrey, lecturer on wool-sorting, School of Mines and Industries.

WOOL-SORTING.—Mr. G. Jeffrey gave a lengthy address upon this subject. The following is a condensed abstract :—

Wool-sorting may be divided into two headings, viz., sorting (or, as it is commonly called, "classing") on the station, and sorting as it is done for the woollen and worsted factories. The former is of most interest to Australians, so we will deal with it. The object of wool-classing is, or ought to be, to get up the wool in such a way as to create most competition amongst buyers, and thus bring the best possible prices to the grower.

In order to thoroughly understand the necessity of such work, I would remind you that all manufacturers, or their agents, the woolbuyer, do not require the same class of wool, nor indeed can they use it. Thus we hear of "top-makers," "carders," &c. The top-makers are engaged in making worsted goods, while the latter makes woollen goods. The former require a combing wool, which is a wool of a fair length and strength; the latter require a clothing or short wool, although a long wool, if tender, is often used by the "carders." Although of late combing machinery has been so much improved as to comb comparatively short and tender wool, this improved machinery is as yet principally confined to the Continent, so that if you are to bring such important sections as the Continental and Yorkshire buyers into competition, you must still separate the short and tender wool from the sound, long wool. It is, however, unnecessary to brand bales "combing" and "clothing"; in fact, it is better not, as buyers know themselves what sort of wool is before them, and I would advise branding bales by alphabetical letters, advising the brokers what they mean, and thus assist them in the proper laying out of the wool on the showroom floors. But what is almost as important as dividing the fleeces into their different qualities is the proper skirting, rolling, and general "get up" of the clip. The advantage of such work can be seen when you consider that the buyers have only a short time to spend in valuing each lot, and must of course take something for granted, so that if they come across wool, for instance, from the North (where the backs of the fleece are usually full of sand, as well as being poor and tender), badly skirted, and the sandy backs left in, they are at a considerable disadvantage in estimating the yield of clean wool (which is the principle on which all wool is bought), and you may be sure they are going to be on the safe side, which means that the grower has to suffer. Whereas if the fleece is well and evenly skirted, the backs (when bad) taken out, and the necks (if full of twigs, &c.), also taken out, the remainder neatly rolled up, and not tied with string, but carefully put into bales, buyers approach such lots with confidence and are not afraid to stretch as far as their limit will allow, and if this is done from year to year the brand of such a well "got up" clip will go a long way to sell it. The number of sorts to be made should depend on the quantity of sheep shorn. On a large Merino station I consider five fleece sorts are ample, such sorts consisting of first and second combing and first and second clothing, and a cast sort, made up of all fleeces which are too faulty to put with the other sorts. On a smaller station make fewer classes, which sorts to be omitted depends on the condition of the clip. The reason why I advocate this modification is because buyers can and do pay a higher price for large lots than they do for small ones; hence to meet them in this respect I advocate making the proposed alteration—in all cases having the pieces carefully sorted, being sure to leave no stains amongst them. The bellies should be kept by themselves, and the stains taken out of the wethers, as well as large dags sorted out of the locks. I cannot too strongly condemn the careless way in which many of our farmers send their wool to market. We often find that the shearing is done in a barn or some dirty place, where the fleece gets mixed with straw. Then, again, we find that Merino and crossbred fleeces are mixed together, and more commonly we find locks, bellies, and skirts all tumbled up with the fleeces. Let me say, as one with long experience in wool buying, that such a way of going about work is not only slovenly and careless, but it costs anyone who adopts such tactics very dear. What would you think of a farmer who sent butter to market in gr-at dabs, instead of having it nicely made into rolls or squares? Well, if it is important to get up butter nicely, it is just as important to get up wool nicely. To start with, such wool as I have described seldom if ever attracts the attention of the direct buyer, and usually falls into the hands of our local woolscourers, who generally buy on spec., and thus have to allow for emergencies. and even they are most chary in dealing with such badly got up lots. It is a common error among farmers to think that it does not pay to skirt their wool. In my capacity as woolsorter at the Lobethal Tweed Factory I have frequently met with intelligent farmers who have expressed themselves thus :—"My neighbor does not skirt at all, but simply bundles all together, and gets as good a price as I do, who skirt carefully and keep the bellies and locks out." Let me try to explain how such a thing might happen, and at the same time in no way alter the fact that it *does* pay to properly skirt. To start with, then, please understand that, although wool is bought ostensibly in the grease, it is in reality bought in the clean—that is, buyers from their experience can tell what amount per cent. clean will be returned after the wool has been scoured, so it is not at all likely that they will pay for dirt, burs, &c.; and when I state that, in the case of Merino wool, it is quite common for it to lose from 40 to 65 per cent. in scouring, you will see how little the uninitiated can tell what the clean yield of any wool will be. Thus in most cases when the unskirted lots bring as good

a price as the well-skirted ones, the facts are that, owing to the lightness of condition, it may have had a 5 per cent. better yield (a mere nothing, you say, but enough to make 1d. to 1½d. per pound difference), so that had both lots referred to been skirted alike the chances are that the first lot would have beaten the other by 1½d. per pound or more. Or it may happen that the badly-skirted lot may have been sold in a dear sale, while the other may have been sold in a cheap one. I trust that I have made myself clear. Let me now briefly advise how to get up farmers' lots. Shear in a clean place, skirt all the fleeces regularly, being sure to have all dirty or stained pieces off. In cases of Merino and crossbred, keep these sorts distinctly apart; do not attempt to class the fleece further than by taking out any very bad fleece which would spoil the look of the bulk, and tear it up amongst the pieces; roll the fleece neatly, not tying it at all; pack carefully (a press is not necessary); do not make the bales too light or too heavy (3cwt. 2qrs. is a fair weight); keep bellies, pieces, and locks separate; do not make mixed bales (they never sell well - small bales or even bags are preferable to mixing); in cases where your wool is very light and condition sound, skirt very deeply, and you may take the eye of the American buyers, and thereby get a most satisfactory price; sell in our local markets; do not hamper your broker with limits, as he knows the value of your wool better than you do, and it is to his interest to get as high a price as possible. I feel sure that if farmers will follow the lines indicated they will find it will amply repay them for their trouble, and their wool will not only be a credit to themselves, but will, I truly believe, help in no small degree to advance Australia.

Mr. Jeffrey showed samples of wool and of manufactures of wool in various stages. In answer to several questions, he stated that the waste pulled from bales at the wool sales is used in Yorkshire for making shoddy. The number of classes into which wool may be sorted would depend upon the size of the station and number of sheep shorn. There is a great difference between northern and southern wool. Northern wool goes to Europe, whilst southern wool goes to America; but only about 800 bales go to America direct, against, say, 6,000 to local woolscourers, showing necessarily a great loss to producers through want of care. Woolbuyers are practical men, and consider all the probabilities when buying. Unskirted wool may sometimes realise a higher price than skirted will at other times, but that is owing to fluctuations in prices and probable difference in yield of wool after the dirt has been cleaned out of it. Second cuts are very bad, but when the boys throw the fleeces on the tables most of the second cuts or "butterflies" fall through. Machinery nowadays is so perfect that "break" (unless very bad), does not much matter. "Yield," in most cases, accounts for seeming difference in prices. Farmers should "go in" for good sheep, and, with care, they will get good wool. At conclusion a hearty vote of thanks was carried.

Port Germein, July 23.

Present—Messrs. G. Stone (Chairman), W. Head, W. Crettenden, W. Mortess, D. Thomson, W. Broadbear, A. Thomson, A. H. Thomas, and H. J. Gluyas (Hon. Sec.).

OFFICERS.—Messrs. G. Stone and H. J. Gluyas were elected Chairman and Hon. Sec. for ensuing year.

ANALYSES OF FERTILISERS.—Members expressed their appreciation of the arrangements made for the analyses of manures at the School of Mines for members of the Bureau.

ILL-FITTING PLOUGHSHARES.—The Chairman referred to the trouble experienced owing to the shares not fitting the foot properly, and thought it was a pity a standard shape and size was not adopted. Other members had also experienced the same difficulty.

EXHIBITS.—Mr. Broadbear tabled samples of oranges and lemons, also Mammoth squash, grown with but slight irrigation. Members were surprised at the quality of the fruit considering the severity of the past season. Mr. Head showed White Elephant potatoes of good quality.

Port Pirie, July 26.

Present—Messrs. J. Lawrie (Chairman), T. Gambrell, G. Hannan, F. Humphris, H. B. Welch, M. Wright, G. Robertson, P. Spain, W. Smith, W. J. Mallyon, and R. J. Ferry (Hon. Sec.).

FIELD TRIAL.—Delegates reported that it had been decided to hold a field trial of implements, &c., under auspices of the District Branches of the Agricultural Bureau, on the day following the Crystal Brook show.

LECTURES.—Decided to endeavor to arrange for lectures in the district by the Professor of Agriculture and the Dairy Instructor.

VINE-PRUNING.—Mr. R. J. Ferry read a paper upon this subject. The following is a short abstract:—

After recognising the great practical value of the teaching and demonstrations given by the Professor of Viticulture and pruning of the vine, he still thought that the varying circumstances of different localities would require different treatments. His experience taught him that all the short-wooded varieties, usually prolific and hardy, should be spur-pruned. In starting he would cut a two-year vine to within 3in. of the ground, leave three strong shoots at regular angles to form the vine, reduce them to two buds on each by cutting through the third node, remove all other buds around the spurs. In following years pains must be taken to train the vine to cup shape, and leave no more spurs than it is capable of supporting. In doing this the fertility of the soil and probabilities of season must be considered. The 3in. standard stem and gooseberry-bush style of pruning are preferable in respect to the short-noded vines for several reasons—they bear equally well as when trellissed, afford good shelter to the fruit, we can work the land two ways and thus save a deal of hoeing, and the strong gully winds cannot so readily injure the young shoots, as is the case with trellissed and rod-pruned vines. When the young shoots are a foot to 18in. long, in September or November, a single piece of binder twine tied around the whole till the whole of the outer shoots bear gently against the band, will support the lot, so that they will swing in a compact body and prevent any shoot being broken off. The Doradilla (which is also known as Morillon, Golden Chasselas, Jean Blanc, Plateado, Plateadillo, and Leather Jacket), although not a short-noded variety, will give phenomenal good results from spur-pruning. With most of the vines having wide spaces between the nodes, or joints, rod-pruning is favored, because it saves labor and expense. A well-matured vine should have two to four branches, according to its stability, fit to form the rods. These should be cut to about 18in. in length, and must be of last season's wood, not water-shoots, which are only admissible where there are not older shoots to balance the vine. Then cut out the other branches, leaving four spurs with two eyes on each to grow shoots for the following year's rods. This is necessary, so that the old rods can be cut every winter and be replaced by new ones. Great care must be taken to prevent breakage when fixing and tying the rods. They should be bent from one to the other in a circle round the vine, and then tied; or, if possible, twisted together to keep them in their places. If tied the cords are liable to cut into the young growth. To protect these vines against the strong winds it is desirable to drive a stout stake near the base, and tie a cord round rather low down and another near the top.

Auburn, July 28.

Present—Messrs. W. R. Klau (Chairman), S. Ford, W. F. Keynes, J. B. Schober, and Dr. J. W. Yeatman (Hon. Sec.).

FALLOWING.—Mr. Ford read a paper on this subject to the following effect:—

In this district, where most farms are favored with soils that are capable of being worked to a good depth without interfering with the subsoil proper, I am of opinion that the land for fallow should be turned up to a depth of at least 7in., thus giving the rains, air, worms, and sun every opportunity of performing their respective functions, necessary to a due fertilisation of the land. In all cases fallowing should be done early, so that the seeds of all weeds and rubbish may receive plenty of moisture from the late winter rains to ensure a good germination during the spring, when they can be effectually dealt with, but will be able to start right away with seeding operations as soon as the first rains fall, or even before where the land is workable and there is liability to flooding. Early fallowing will, of course, entail a little extra labor in killing the weeds; but all the extra workings the land

receives in this respect will tell to the advantage of the succeeding crop. On the other hand, with late fallows, the weeds must be allowed to grow prior to commencing seeding in the autumn, when the weather is less favorable to the killing of rubbish than the fine warm weather of spring. Fallow should be allowed to lie as open as possible during winter, that it may "drink in" all the rains that fall, thereby establishing supplies for the future crop; but should be brought to a fine tilth during summer, and the top kept loose so that evaporation may be retarded as much as possible.

I am aware that some farmers in the district do not fallow to any appreciable extent and yet get good crops—a result due no doubt to the fact of their picking out the best patches of their land, not cropping until it has had several years' rest, and only farming on a small scale compared with the size of their holdings—utilising the greater portion for grazing. It would be interesting to know how this policy would work out extended over a course of years compared with cropping one-third of the farm each year (all fallow), which method is now generally accepted as the best system of farming for the northern part of this colony.

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NOTES AND COMMENTS.

The weather during August has, on the whole, been very favorable to the growth of feed and crops, and though at times it has been rather too warm and dry, the rain generally has fallen where most needed, and as we go to press news comes of a splendid fall over practically the whole of the wheat-growing areas, except the West Coast. This will greatly improve the prospects of the crop, as the rain has been steady, and the soil has received a good soaking at a critical period. On four separate occasions during the month, at intervals of seven or eight days, the Northern districts, which have suffered so severely during the past three years, have been blessed with nice showers, which, though rather patchy, except the latest, have been pretty general. The following figures give a fair idea of the total rainfall for the month over the agricultural areas:—Hawker, 2in.; Quorn, 4 16in.; Carrieton, 2·70in.; Petersburg, 1·90in.; Port Germein, 1·36in.; Port Broughton, 3in.; Laura, 2·50in.; Kadina, 3·57in.; Maitland, 3·30in.; Minlaton, 2·70in.; Burra, 3·60in.; Eudunda, 2·90in.; Morgan, 2·35in.; Riverton, 3in.; Angaston, 2·40in.; Hills district, near Adelaide, 1·65in. to 4½in.; South-East, 1·25in. to 2·30in.; West Coast, 1in. to 1·75in.; Franklin Harbor, 3·43in.

Mr. Max Koch, of Mount Lyndhurst, near Farina, writing to the General Secretary of the Agricultural Bureau, says nice rains fell in June, 2½in. to 3in., and although July was dry about ½in. fell during the first week in August. The effect of this rain proved once more that after years of dry weather there still remains in the soil abundance of seed ready to spring forth and produce luxuriant pasture when seasonable and sufficient moisture causes them to germinate. All species of the order Chenopodiaceæ are in a flourishing condition, and millions of young plants have sprung up, and will produce good feed later on. The tableland country is well covered with the native and introduced geranium, while the various species of Zygophyllum are widely and thickly distributed and the Cruciferae are well represented. There is no grass, however, at present, and while the plants mentioned and the many others which go to make up the pastures so relished by sheep and cattle are beautifully fresh and green, it is rather singular to note that the larger shrubs and trees present a very desolate appearance. They do not seem to have recovered from the continued drought, and a large portion of them are, to all appearances, quite dead. Only a few years ago the Pindalpena Creek was so thickly overgrown with cotton-bush and Acacia sentis that it was a difficult job to find a way through on horseback. Now nearly all the acacia is dead and blown down, and

the cotton-bush looks very miserable. The Cassias, so plentiful in the past, have suffered severely, and even the mulga and gums look poor and sickly. The rains during past three months are the first real good winter rains experienced here for years, and the herbage of the district will now have a chance to recuperate.

Is it pure ignorance or is it subtle craft which impels certain persons to foist crushed oyster shells, lime-kiln refuse, gypsum, and other rubbish upon the long-suffering farmer in substitution for superphosphate of lime? Quite recently it has been proposed to manufacture "superphosphate" from gypsum by the addition of a little colonial guano and a lot of sulphuric acid. If the gypsum were left out the mixture of guano with a moderate quantity of sulphuric acid would make a super-guano, valuable in proportion to the amount of phosphoric acid contained. Gypsum contains no phosphoric acid, and cannot be converted into phosphoric acid by any method. It is simply sulphuric acid and lime (Ca SO_4)—one part calcium, one part sulphur, and four parts oxygen, and is of no value whatever as a fertiliser for a wheat crop. Neither can shells or lime-kiln refuse be converted into superphosphate by any means. All these substances may be useful in loosening stiff clay soils, and gypsum is valuable on alkaline soils, but they only affect the mechanical condition of the soils, and do not fertilise directly.

Inquiries have been made concerning the best way to store onions. In the first place, only good keeping sorts should be chosen. These should be very carefully handled all through. Harvest when quite matured, never whilst the sun is very hot upon the field; remove at once to a cool sheltered place; let them dry off every particle of outside moisture and remove every bulb that shows the smallest sign of green or that is not quite solid, compact, and those with loose skin. Place them on trays in single layers if possible on racks or one tray upon the other without pressure and in a wind-proof, cool, sheltered room or in a dry cellar. In absence of a cool room or a cellar the onions may be pitted or "clamped," taking greater precautions to reject all but the most perfect bulbs.

Why do we not consume larger quantities of fruit in this colony? Is the price demanded by the shopkeepers at all comparable with the price received by the grower? Is the fruit generally ripe, clean, sound, plump, fresh, and as well flavored as when gathered by the grower? In country shops do they often expose fruit for sale that a grower would feel it an insult to his pigs were he to throw it into their sties? Is it probable that the dumping upon the market of a lot of rubbish can possibly interfere with the sale and use of first-class fruit, or tend to reduce the selling value of best-quality fruit? These are questions which ought to be seriously considered by every fruitgrower. American growers have long since learned that it does not pay to market inferior stuff, because it gluts the markets and reduces the value of the best to "bedrock" prices.

In order to make beet sugar manufacture profitable it is necessary to erect works at a cost of not less than £140,000. These works must be supplied with unlimited fresh water and enormous quantities of fuel. To keep the machinery going the produce of not less than 3,000 acres of beets is required annually. Although sugar beets will thrive almost anywhere in temperate climates, there

are many soils and situations that will not grow them fit for sugar-making. In advocating the establishment of beet sugar factories it is better to be sure than sorry, and all the conditions and circumstances should be carefully ascertained before urging people to enter upon what may prove to be a disastrous undertaking. Grow sugar beets for feeding the live stock, but be careful when talking about sugar.

In the sugar-producing districts of Queensland the sugarcane is attacked by the grub of a beetle, which causes immense damage. In some districts funds had been raised by voluntary rates of 1s. per acre, the amount so raised being subsidised by the Government. In the Mackay district alone 16 tons of beetles were destroyed last year and over 14 tons already this year. Sixpence per pound is paid for the beetles, and 250 go to the pound, so that the destruction of 30 tons in one district represents about 17,000,000 of beetles destroyed in two years at a total cost of £1,000. A few years' work at this rate should very appreciably lessen the ravages of this pest.

Reports still come to hand regarding the damage to the crops on Yorke's Peninsula and elsewhere by underground grubs. As the beetles appear above ground in the spring of the year and are easily trapped, it behoves the farmers in the affected districts to take active steps to destroy as many of them as possible. They might well follow the example of the Queensland cane-growers, and contribute to a fund from which the children could be paid for catching and destroying the beetles. If this were done for a year or two the pest would be kept well within bounds.

Probably the most dangerous source of infection of an orchard with codlin is the fruit house. The caterpillars leave the fruit directly they have grown to their full size and maturity in that stage of their existence, and then they hide in the best dry safe place they can find, spin a cocoon, and lie dormant till about September, when they change to chrysolides and afterwards to moths. The moths fly away to the nearest apple, pear, or other suitable trees, and the trouble recommences. Therefore it is desirable that every fruit house, store, cellar, or loft where fruit has been stored should be thoroughly fumigated with either sulphur or hydrocyanic acid gas; but it must always be borne in mind that the same fumigation that will kill the caterpillars or other insects will also kill human beings or other animals if subjected for a short time to the fumes.

As showing what can be done in the way of improving the milk yields of a dairy herd by use of good bulls and selection of stock, the experience of the Adelaide Co-operative Society is very instructive. For year ending August, 1896. the average yield from over 100 cows was 450galls.; in 1897 the yield from ninety-eight cows averaged 471·3galls.; and in 1898 from ninety-three cows, 474·2galls.; in other words, the society obtained the same quantity of milk in 1898 from ninety-three cows as it did in 1896 from ninety-eight cows. This average is, of course, much above the general run, but it is by no means exceptional, and could be approached by others interested in the industry by the adoption of the same methods pursued by the society. In the *Australasian* of August 27 Mr. J. Secombe, of Richmond river, New South Wales states that for eight years he has averaged in a herd of forty to fifty cows 555galls. per cow per annum.

At the latest annual county conference of the British Dairymen's Association, held in Devon and Cornwall in May last, Mr. F. J. Lloyd read a lengthy and logical paper, in which he contended that, when properly fed, a dairy cow will neither gain nor lose in live weight, and under such conditions will produce the maximum quantity of milk which her physical condition permits, and the milk so produced will have its maximum quality; otherwise, that food does influence the quality of milk. This contention has been strongly supported by Mr. John Speir's elaborate experiments, which, however, were discounted by similar experiments elsewhere, leading to the contention that whilst the percentage of butter fats is not increased by the richness or quantity of food consumed, the quantity of milk and butter may be considerably increased when the cow is liberally fed with rich and succulent food.

Early in August this year a grocer in Sydney was fined in the Police Court for selling margarine under the name of butter. It was stated that large quantities of this stuff are made regularly in Sydney. The margarine in question was packed in a box marked "North-coast Co-operative Company, Limited, 56lb. nett, creamery butter," thus damaging the reputation of that company as well as cheating the purchaser.

Mr. J. Mathieson and Mr. R. D. Jones, stock inspectors for Victoria and New South Wales respectively, have been travelling through the tick-infested portions of Queensland, and have furnished the Ministers of Agriculture with a joint report. They think the country about Carpentaria and the humid coastal districts is permanently infected with tick and tick fever, but is decreasing in the open country of north-west Queensland. There is great danger of ticks being carried southward along the coastal regions by travelling cattle. Very little reliance can be placed on the smearing of cattle. Oil is effectual for dipping, but is expensive, and is injurious to the skin, and should be discontinued. A cheap dip was made from 1½lbs. arsenic, 3lbs. soap, 3lbs. washing soda, and 100galls. water; but the good results expected from dipping had not been realised, the protection of animals in infested land only lasting a very short period. Perfect fencing was the most effective method of preventing the spread of infection, as it controls the movements of stock, and prevents the mingling of infected cattle with those that are clean. They agree that results from inoculating cattle against tick fever have been very successful, and render the animals immune for at least a considerable time, perhaps for life. It is considered improbable that an animal which has once suffered and recovered from tick fever could have a second attack, and it was generally assumed that the progeny of such beasts would be immune. The system of inoculation with blood from a recovered beast is considered the best. It is not advisable to inoculate until fever is in a district, as the germs necessary to produce fever might thus be introduced, and afterwards spread by tick, which might otherwise be non-fever producing. It is now an accepted opinion that ticks are only intermediary agents, and do not always possess the micro-organisms which induce the fever. Inoculation, although checking spread of fever, does not stop spread of ticks. Stock should not be moved or driven after being inoculated, but left on good, nourishing pastures until recovered. Inoculated cows soon show a decrease of milk supply, which is quickly restored after recovery, when calves allowed free access or when milked during fever; but if this were not done the secretion of milk might cease altogether.

After the second week of September there is not much to fear from night frosts, and all crops liable to injury from such cause may then be sown. Amongst these are lucern, swedes, kohlrabi, summer rape, mustard, maize, holcus, dhurra, all sorghums, millets (setarias, panicums, andropogons), melilotus species, buckwheat, chicory, couch and buffalo grass, pumpkins, melons, squashes, cucumbers, tomatoes, potatoes, egg fruit, beets, mangolds, Johnson grass (a sorghum), poa grasses, sunflowers, tobacco, "tree lucern," and "tagosaste," Italian rye grass. All of these crops should be sown in drills or hills so that the rake and hoe can be frequently used amongst them. The surface should be kept constantly loose and fine to a depth of not more than 2in., so that not a single root shall be injured. By this means the air can find its way into the soil; and thus not only will evaporation be prevented, but absorption of moisture from the air will actually be promoted in considerable quantity. Air is an essential to the roots of plants, but it cannot easily find its way if the surface soil is hard and compacted; but the moisture will evaporate rapidly, and the hard dry surface will suck up moisture from the subsoil and lose it quickly.

About this end of the month will be safe to sow buckwheat (*Polygonum fagopyrum*), which does well on poor soils—sandy, stony, clay, or peaty soils. Seeds begin to ripen within eight to ten weeks after seeds are sown, and continue to be produced for a long time. Plants should be mown when there seems to be a good lot of matured seed on them. Let the crop dry in windrows, then cart it in and tread out or thrash the seeds, and clean by winnowing after raking off the straw, which is good fodder for cows. The plant is much liked by cows and all live stock; the flowers yield the best of honey. Buckwheat cakes and bread are a well-known delicacy in the United States of America. Sown in drills, 1bush. (50lbs.) per acre of seed will suffice, but if sown broadcast, as much as 150lbs. may be wanted if the sower is clumsy. Birds and poultry are very fond of buckwheat.

CROPS IN THE NORTH.

A correspondent writes as follows on the condition of the country between Booleroo and Port Pirie, and Booleroo and Hammond:—"The crops in Appila are looking very well, and near Laura there are some very promising crops, which will with favorable weather yield heavily. Along the railway line towards Gladstone everything is looking at its best, but towards Crystal Brook the crops are somewhat backward. Near Crystal Brook some crops are looking very well, and toward Port Pirie they are more forward, but rather spindly, not stooling so well as in the Hills. Taking the country as a whole, however, there is every prospect of good crops and plenty of feed. In Booleroo there are some very fine crops, but others are very backward. In Willowie some of the crops are very good, others thin owing to the grain malting in the soil. Near Willowie township crops and feed are backward, and require very favorable weather to make them yield well. Near Amyton the crops improve, and at Hammond are looking well, and with fair weather will yield good returns."

SKIM-MILK FOR CALVES.—Boil 1pt. linseed in 6pts. water for one hour. For a calf ten days old add a teaspoonful of this linseed jelly to each feed of skim-milk. Gradually increase the quantity till it reaches a quart to each feed for a calf two months old. Warm the skim-milk to 80° F. A calf three weeks old should have some meal or other food with the milk.

CROSS-BREEDING OF SHEEP.

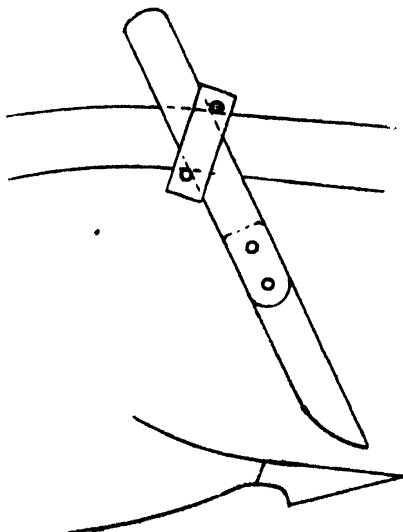
BY T. H. WILLIAMS, MANAGER OF GRAHAM STATION, MILLICENT.

I have bred sheep from cross-bred rams and cross-bred ewes by using a first-class Lincoln ram of high quality and thickly-clad Merino ewes. In selecting the progeny to be kept for rams I always kept those having a decision of character in the wool, discarding anything inclined to be plain, rough, or fuzzy, no matter how well-clad they may have been, and taking care to have clean, soft face and ears of the pronounced Merino type, but without horns. Invariably a cross-bred sheep with a head of this description will carry a fleece showing decided character, evenly and distinctly serrated, which is of paramount importance in cross-breeding, because, without it, bulk of fleece may be obtained without corresponding weight of wool.

I used the above description of rams on one-half and three-quarter Lincoln-Merino ewes, and found the progeny remarkably good-doing sheep, of very robust constitution, most suitable for selling as lambs; but those which I kept on to take one or two clips of wool from did not altogether satisfy me, as they were very uneven in the wool. A great many, although very large sheep and well clad, cut light fleeces of fuzzy wool of a nondescript type; consequently I abandoned this method of breeding, except for market lambs. They are certainly much better doers than lambs got by Lincoln rams from the same sort of ewes, being closer built and not nearly so inclined to waste during transit by rail or otherwise to market. In conclusion, if breeding for wool principally, and if fattening the surplus is only to be a secondary consideration, I would use nothing but pure sires—either Merino or Lincoln—no matter what sort of ewes were being used.

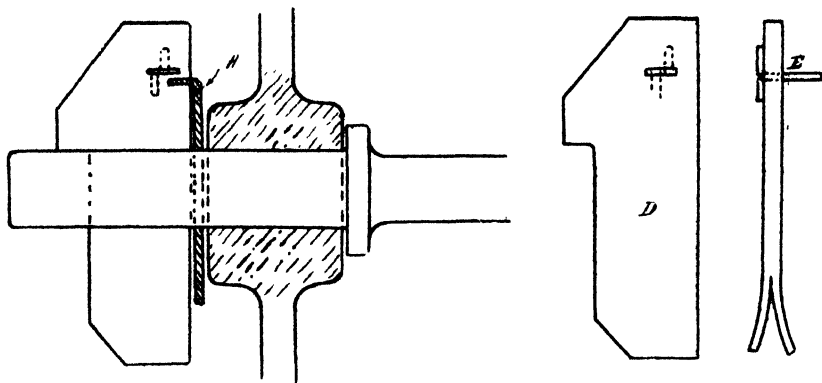
SOME HELPS FOR THE FARMER.

Mr. Thomas H. P. Tapscott, of Orroroo Branch, sends two models of useful articles which he has employed for some time. The first is a coulter for ploughs made in two parts, thus—

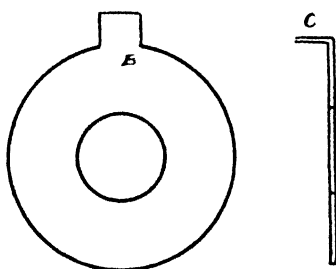


The stock, or upper part, of the coulter is made of iron, with a slot and holes for bolts. The lower portion is made from old steel rasps, files, or springs, which are cheap and last a long time.

The other model is that of a key, or cotter, and washer for plough wheels, &c.



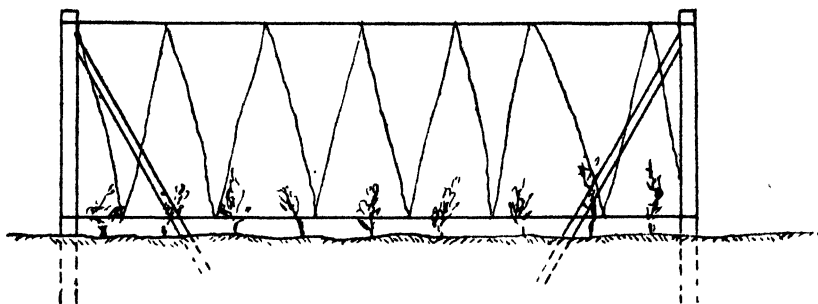
The above sketch shows the cotter (or key) and washer (or shield) in position on the axle of the plough, scarifier, &c., with the lip or ear on the edge of the washer bent over so as to cover a similar projection through the upper part of the cotter, thus preventing it slipping out and becoming lost. [This may prove better than a ring through the head of the cotter (or key), falling over the end of the axle.—ED.]



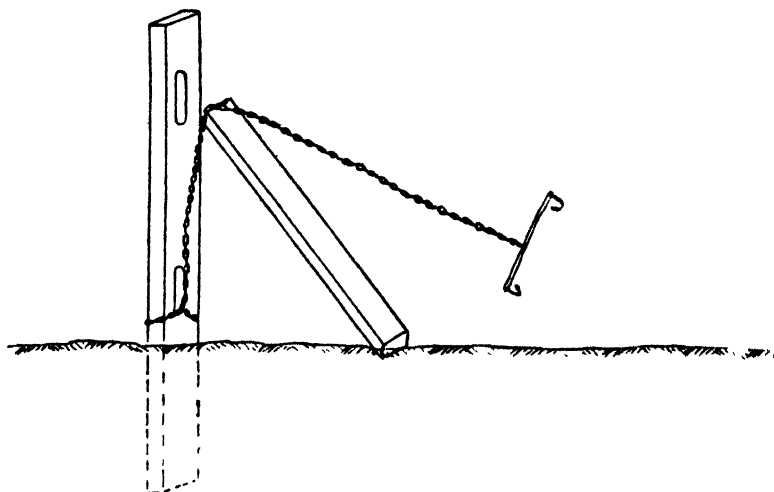
The sketches B and C illustrate the washer (or shield) and a sectional view with the lip turned over, and D and E show the key (or cotter) with also a sectional view. The artist has introduced the usual engineer's split-end on the cotter, which is not provided on Mr. Tapscott's model.

For trellising peas, instead of sticking them, the editor suggests a couple of iron fence-posts, or, in absence of these, two wooden posts, two lengths of old fence wire, some old binder twine, and two struts. This device can be quickly

erected for each row, and more quickly removed and stored when done with for the season. The following illustration shows how the material can be utilised :—



Mr. William Balk, Tantanoola, sends his plan for lifting fence posts, as follows :—



With help of a stanch horse and a boy one man can lift a mile of fence per day.

RASPING HORSES' HOOF.—Rasping the outside casing of the horses' hoofs is absolutely unnecessary in nearly every case, is altogether opposed to common sense, is unscientific, useless, and undoubtedly is very injurious to the feet. The ignorant smith makes a bad shoe, and tries to fit the horse's perfect foot to his imperfect shoe, first by burning the hoof, making it brittle, destroying the natural oil-ducts and texture of the hoof, and inflicting great pain on the horse; and then he rasps away the wall, exposes the laminated fibre beneath, so that it soon became disorganised, and he weakens the wall every time, so that the hoof cracks and breaks away from the nails. No wonder so many horses go wrong on their feet.

POULTRY NOTES.

BY D. F. LAURIE.

Written for the "Journal of Agriculture and Industry."

[NOTE.—It will save much time and trouble to the Committees of various Agricultural Societies if they will kindly accept the intimation that, as my time belongs to the Government, the head of the department which I serve (the Engineer-in-Chief) cannot consent to my undertaking judging at any show, nor can I be spared to lecture on poultry. For this reason I have already been compelled to decline numerous kind invitations to adjudicate this season. I am, however, at all times willing to devote part of my own time to answering queries or to advise as to purchase of stock or eggs. All inquiries should be accompanied by stamped envelope for reply. My pamphlet on "Poultry Raising for Export" is obtainable only from the Manager of the Produce Export Department, price 6d., postage 1d. extra.]

The success which attended the initial exhibition by the Boys' Reformatory, Magill, of poultry at the recent Poultry Show, Adelaide, must be hailed with satisfaction by all who realise the responsibility of training the untoward youth of the city. It is gratifying to know that my recommendation was approved, that the stock imported has proved most suitable, and that the institution has now laid the foundation of what should prove a valuable adjunct to self-support. Duck-breeding on a large scale would prove very payable at Magill, and should be encouraged.

It is very cheering to note the great attention now being devoted to the various utility breeds. At the recent poultry show they were much to the fore. Dorkings made a strong muster, and it was owing to Messrs. Thyer & McEwin, Hair & Son, Gabb, and the Boy's Reformatory that we saw a collection seldom equalled in Australia. We know that to someone or other every breed or variety of poultry is the main one and the favorite. Still it is noticeable that several breeds—some merely ornamental, others proved unstable—have of late dwindled in numbers. Prominent among these we find Cochins, Brahmas, Polish, Black Spanish, Plymouth Rocks, and Hamburgs.

Continuing a review of utility breeds of the poultry world, we now find the Indian Game occupying an honored position. Among the good workers in this direction are Messrs. Osborn, Hair, J. Smith, and Pitman. Again the Boys' Reformatory wins honors at the show with birds bred from their imported and other strains. They gained the Government special for best Indian Game cockerel, and should undoubtedly have been awarded the special in Dorkings. Both Indians and Dorkings are strongly represented in South Australia, therefore we can now obtain the most approved purebreds to breed the crossbred so much in demand in the markets of England. The Indian Game-Dorking cross stands first for market purposes.

Malays, although not equal in quality of flesh nor so docile as the Indian Game, are still in a strong position; but it has to be remembered that the show Malay is too much on the leg for one thing.

Plymouth Rocks never appealed to me as embodying other points of excellence than are to be gleaned from the advertisements of breeders; they are yellow skinned, yellow flesh and legs, and are of no great account either for laying or crossing. One reason why they are unpopular is that there is a great difficulty in breeding to color; the breed is very composite.

Langshans are firmly established everywhere, and South Australia is not far behind in quality; still some authorities aver that the show bird is not equal to the less ornamental utility bird of the old type; the judge divided honors in this respect.

A breed very much in favor everywhere now is the Orpington, a very excellent all-round bird; it derives its qualities from the Langshan and the Minorca. In time we shall see a preponderance of birds of the correct type here; at present, owing to lack of experience on the part of breeders and knowledge on the part of the judges, a very indifferent type has been put forward. This is a utility breed; there should be size, with quality and fineness of flesh, skin, and bone. To retain this, we must adhere to the correct type, which does not portray a leggy bird with no breast and keel. I saw some very fine specimens in Sydney. At the Adelaide show some very young specimens of fair type were passed over by the judges. They were worthy of a place. The long-legged ones were not correct in many ways.

Wyandottes are making slow but steady progress here; in Victoria and New South Wales they are very popular. This, like the Orpington, is an all-round fowl; the Orpington is of English, the Wyandotte of American origin. A great feature in the Wyandotte is its early maturing and suitability for crossing. This breed deserves consideration at the hands of the general poultry breeder.

Minorcas, the breed of all for laying, are in a very strong position; this is owing largely to numerous importations of high-class stock. In England they pay particular attention to the laying powers of the Minorca hen, and it is gratifying to hear that imported birds are realising expectations in this respect. I always advocated the Minorca as a great layer, and also because good ones are large, and their introduction will not tend to the production of so many miserable bantams which result from the use of the equally good laying, but small, Leghorns.

Andalusians, although fair layers, are out of fashion on account of the colour difficulty. People cannot understand that a composite colour, such as blue (so called), in a fowl, often turns to black, white, or mottled in the progeny.

Hamburgs have of late been bred too much for show points, and many important qualities have been forgotten.

Whilst Pekin and Rouen ducks are to the fore, Aylesbury ducks are stagnant, and I incline to the belief that the statement that the climate is not very favorable for this breed is correct. The Indian Runner duck is very popular, and so great has been the demand that specimens are at present difficult to procure. As a sample of their laying, Mr. Pitman sends me the following account of eggs laid by nine ducks of this breed:—

August	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Eggs	7	8	8	8	8	8	9	8	5	8	7	8	8	9	9	9	8	8	8

Total, 151 eggs for nineteen days.

PLANT-LICE OR APHIDES.—At the end of autumn plant-lice (aphides) produce male insects, and after this the females lay eggs, instead of giving birth to perfect female young. The eggs are deposited upon the bark of the particular kinds of plants most liked by each species of aphid, generally near the terminal twigs, where the young growth will first appear the following spring. When the growth recommences the eggs are hatched, and every aphid then appearing is a female, capable without the intervention of any male insect—(there are absolutely no males until the end of the autumn)—of producing a perfect female insect every few minutes of her life, and each of her young, and of their young generation after generation, also produces nothing but young and perfect females. The possibilities of increase from a single “clutch” of eggs from one impregnated female of last autumn’s brood is beyond all power to calculate. The importance of winter sprayings to destroy those winter eggs is therefore manifest.

HOUSEHOLD HINTS.

ORANGES AND LEMONS, TO PRESERVE.—Take as many oranges or lemons as required, with a little more than their total weight in white sugar. Slightly grate the surface of the fruit, and score them in circles around, but not deeply. Place them in cold water for three days, change the water three times a day. Tie then in a cloth and boil until soft enough for the head of a pin to easily penetrate the peel. Meantime put half a pint of water for each pound of sugar in a pan, and let boil five minutes; then put the fruit into the boiling syrup, and let it boil for half an hour. The pan should be kept closed, so that the steam shall cook the fruit that may not be covered with the syrup.

CHEAP PAINT FOR WOOD AND IRON.—1lb. new unslacked lime, grind up with $\frac{3}{4}$ lb. of boiled linseed oil; add this to 2galls. skim milk, stir well; then add 14lb. whiting and 1 pint raw linseed oil. Let stand twenty-four hours, and apply with a large brush. This paint is dead white, but may be colored by mixing any of the painters' pigments, ochres, &c. *Another Recipe.*—Take any quantity of skim milk, and stir in gradually best Portland cement until the mixture is as thick as batter. Then apply with a large brush.

STRAWBERRIES, TO PRESERVE.—To each pound of fruit add 18ozs. sugar, and place in a pan over a slow fire till the sugar has melted, then boil fast for twenty minutes. Have small jars all ready treated, place the fruit in boiling hot, seal up at once, and keep in a cool cellar.

SPARROW POISON.—For 112lbs. small wheat use $\frac{1}{2}$ oz. Blundell's strychnine, 1oz. acetic acid, 7qts. water. Mix the acid and strychnine in a bottle with a pint of water, then mix the solution with the rest of the water and pour the wheat into the diluted poison. Stir with a stick daily for two or three days, till all the liquid is absorbed. Then dry the grain on iron sheets. Destroy or thoroughly cleanse everything used in this preparation.

CHEDDAR CHEESE MAKING.

BY G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

To become a competent manufacturer of Cheddar cheese one must necessarily possess a good knowledge of the sciences applicable to dairying, and have this knowledge combined with skill, the outcome of experience. Without this necessary education the maker is working in darkness. There are successful cheesemakers with little or no scientific education, but their attainments have been gained by dearly-bought experience. Unfortunately many men and women are directly opposed to technical instruction, and become quite indignant when such a matter is referred to. It is absurd for any one of us to profess perfection, even when possessed of all the scientific education and skill within reach. Professor Drummond, of Canada, our greatest authority on Cheddar cheese, delights to tell that, after many years of experience and study, he is learning something every day. The motto of the Royal Agricultural Society of England says, "Practice with science," that of another learned body "Work and learn."

Under the heading of Cheddar cheese making we have two systems of manufacture—the "Canadian" and the "American." I will endeavor to deal with the Canadian system in a short and simple manner, keeping clear of unnecessary technicalities. Before proceeding with the process, however, it is necessary to explain matters having an important and direct bearing upon the manufacture, and, to prevent confusion, is better mentioned in advance.

The first necessity in the making of good cheese is pure milk and cheese-making rooms free from dust and bad smells. If milk once become inoculated

with dirt it will be a matter of chance whether the maker produces an article capable of reaching maturity in a sound and wholesome condition. The injurious effects of germs are not always apparent in the making room, but the truth is too often revealed later on.

Aeration of Milk.—In many districts weeds prevail to such an extent as to render the manufacture of first-class cheese impracticable at certain seasons of the year. By the simple process of aeration nearly all odors and injurious gases are usually liberated, and the development of bacteria is arrested. Without this check upon fermentation an excess of acid would be formed, producing over-ripeness. By adopting aeration less milk is required to make a pound of good cheese, and more perfect coagulation by rennet results.

Milk of Different Breeds.—The most adaptable class of cattle for cheese-making purposes is the Dairy Shorthorn-Ayrshire cross, the milk of which contains the fat globules of a size easily retained by coagulation. In the case of the Jersey or any other breed giving milk with large fat globules great care is necessary to avoid a loss of fat and casein throughout the cutting of the curd and stirring, and to obtain a green whey free from the valuable milk constituents is a matter of difficulty. In the spring of the year, when weeds are abundant and cows coming into milk, a great deal of trouble is caused by bad flavors becoming permanent in the milk. With the Jersey cattle this taint is distinctly higher than in the case of the Shorthorn or Ayrshire owing to the quality of the milk. An alteration in the milking period would partially reduce the annoyance.

Colostrum.—This milk is quite unfit for cheese or butter making purposes, and when used decomposition invariably follows. Colostrum is rich in color, albuminoids, and mineral matter, but is poor in fat. By the action of heat the excess of coagulated albumen points to the nature of the milk. Milk ought never to be used before the fifth day after calving.

The following analysis will show the difference between colostrum and normal milk:—

	Colostrum.	Normal Milk.
Water	71.90 per cent	87.50 per cent.
Fat	3.00 “	3.50 “
Casein and albumen	20.70 “	3.75 “
Sugar	3.30 “	4.50 “
Mineral matter ..	1.10 “	.75 “

Variation in Soils.—Variation in soils demands consideration in the making of cheese. Milk from pasture on chalky lands, and where the drinking water of cows is heavily charged with lime, will exercise a drying influence on the curd and a neutralising effect upon the acid. To avoid error we here find it necessary to work the milk at a lower temperature, as moisture is easily expelled in the cooking process.

In milk from cows grazing on boggy land and rank herbage the cheesemaker will meet with many obstacles. There is a difficulty in getting rid of the excess of moisture, development of acids is slow, and the curd shows a liability to run together, and bitterness in the immature cheese generally follows. It is advisable to allow the milk to become ripened, cut the curd firmer and of a smaller size, and heat steadily. By so doing the more perfect contraction of the cubes will remove the moisture and prevent mistake.

Ripening of Milk.—Ripening means allowing fermentation to proceed to a certain extent. Utmost care is required to prevent over-ripening, the effect of which cannot possibly be satisfactorily overcome. When sweet milk is heated to 83° F., and occasionally stirred for one hour, a degree of ripeness will have been gained, or, in other words, a saving of time in making, with increased quantity and quality of green cheese. In using the word “quality,” I must not omit that the ripening must follow the action of a favorable ferment—the common “sour-former” (*Bacillus acidilactici*). Milk obtained from cows under

uncleanly conditions cannot possibly develop the good ferment so eagerly sought after by cheesemakers, but will contain detrimental forms productive of bad gases, as we find in floating curd. In South Australia, with its cheese-making seasons unsurpassed, ripening of sweet fresh milk can be accomplished with safety by the addition of a starter (*i. e.* sour milk produced by a ferment of pure cultivation). Where buttermilk of noted quality is procurable I have found the addition of 1 per cent. of surprising value in the ripening of milk. It is undesirable to adopt ripening for a few weeks after the beginning of the period of lactation in cows, as the milk has a tendency towards souring. Bacteriology, chemistry, and botany are all strikingly brought into effect at this stage, and the foremost science undoubtedly governs the success of the dairy.

Testing for Ripeness.—Very much depends upon the time of renneting. Within about an hour from commencement of artificial ripening the milk will be ready for renneting, and should be tested so that the exact time for this operation may be ascertained. The principal methods of testing are rennet test and the chemical test.

Rennet Test.—This test is undoubtedly the most perfect indication of the condition of milk for cheese-making, and is a guide to the maker in the after treatment required. The test is a difficult one, but when acquired the cheesemaker may congratulate himself when he is able to conduct it invariably to a successful issue. The following is the process:—Four ounces of milk from the vat at renneting temperature of 84° F. is accurately measured into a graduated glass, and is placed in a dish of water of equal temperature. One drachm of rennet (3·5 cc.) is put into a cup previously taken from the water of 84°. The milk is now added and stirred rapidly for ten seconds, the time of adding being noted on the second hand of a watch held in the left hand of the operator. Upon ceasing to stir the forefinger of the right hand is put under the surface of the milk and quickly raised, this being smartly repeated until the first indication of coagulation is observed. At this moment the number of seconds after the admission of the milk is noted, which indicates the ripeness or degree of acidity. If coagulation takes place beyond twenty-two seconds the milk is too sweet, if eighteen seconds and below too fast. In some places pieces of straw and cork are made to rotate in the milk, and the time of coagulation is recognised immediately the bodies stop. Such a test is a dangerous guide to renneting, as the period of rotation depends largely upon the surface and size of straw or cork used and speed of rotation. To attain proficiency in the finger test requires perseverance, but it is worthy of continued practice by every cheesemaker.

Chemical or Alkaline Test.—A 10 per cent. solution of caustic soda is poured into an upright graduated tube or burette, provided at the lower end with a small piece of indiarubber tubing, having a pinchcock, which upon pressure can admit the smallest quantity of the solution through the glass outlet tube. The burette is fixed upon a stand, and in some instances the solution is supplied by means of tubing connected from a glass bottle to the upper part of the graduated tube. By means of a pipette ten cubic centimetres of milk are taken out of the vat and run into a porcelain dish. Into the milk are thoroughly stirred four drops of a solution called phenol-phthalin, which acts as an indicator of neutrality of the acid. The porcelain dish is placed under the burette, and the caustic soda is admitted cautiously until a delicate crimson tint remains permanent in the milk, when the acid will be neutralised. The quantity of caustic soda used will be observed by reading the graduation marks upon the burette. If two cubic centimetres of soda have been utilised to neutralise the acid then we will have 0·2 of acid present. The test is of great advantage when evening's milk is kept over-night and mixed with that of morning's milking, as a tendency to over-ripeness is generally apparent. If 0·19 of acid were present in milk such would indicate under-ripeness; if 0·22, then the desired

acidity for renneting is present. To ascertain when to remove the curd to the cooler test the whey, and when the reading shows 0·17, sufficient acid has developed. At the period of salting 0·8 is considered satisfactory. I would not recommend any one to lay too much stress or to be entirely guided by the above test.

Detecting Preservatives in Milk.—As the active ingredients in a preservative consists very often of the acid of borax, the alkaline test can be adopted as a means of detection. Milk unadulterated will usually taste sour when it contains 0·35 per cent. of acid, but if an acid preservative has been added the milk may become thick and yet remain sweet to smell and taste. By the application of the test, if the reading shows 0·35 per cent. or over and the milk imparts to the taste no perceptible acidity, in all probability the milk has been adulterated with a preservative, and is certainly useless for cheese-making.

Acidity Experiment in Cheese-making.

Milk before Renneting.	Whey before Breaking	Whey after First Cutting.	Whey when Drawn.	Curd Whey when taken to Cooler.	Curd Whey at Salting.	Liquid from Press
·21	·14	·26 — ·71	·17	·20 — ·47	·85	1·01
·21	·13	·14 — ·75	·18	·13 — ·53	·90	1·2
·21	·13	·45 — ·70	·18	·32 — ·50	·93	1·35
·20	·13	·29 — ·71	·18	·24 — ·50	·91	·98
·22	·13	·49 — ·67	·18	·35 — ·50	·98	1·56
·21	·13	·56 — ·63	·18	·35 — ·46	·92	1·23
·21	·13	·52 — ·63	·19	·33 — ·47	·98	1·64

Comparison with Rennet Test and Acid Test.

0·22 = 22 sec., 0·23 = 21 sec., 0·24 = 19 sec., 0·25 = 17 sec., 0·26 = 14 sec.

Hot Iron Test for Curd.—In applying this test a small piece of curd is taken from the bottom of the vat and firmly squeezed in the hand to expel the whey. A bar of iron is heated to a dull red heat, and the curd is brought into contact with the iron and gently rubbed, but burning must be averted. If the curd is matured, and ready for removal to the cooler, fine silky threads of about $\frac{1}{4}$ in. will be drawn; if too sweet they will break away short and thick. The length of the threads is in proportion to the acid in the curd.

Test by Feel and Smell.—Many cheesemakers entirely depend upon the development of acid by the elastic and shotty feel of the curd. To rely solely upon this practical test is one of great risk, as very often a soft and mushy curd will have developed an abnormal amount of acid, and to the hand no indication of maturity whatever is shown. In factories where pure milk is always received for cheese-making, and the working process as a rule normal, the hand test gives a reliable indication of acidity.

Rennet.—Rennet is abstracted from the mucous membrane of the fourth stomach of the calf from two to three weeks old. The active principle belongs to the unorganised or chemical ferments. If milk is freed from soluble lime salts the coagulating power of rennet is rendered useless. If rennet is added to milk sterilised by heat proper thickening never takes place owing to heat partially changing the lime salts from a soluble to an insoluble form. At a temperature of 155° F. rennet ferments are destroyed, and at 50° F. there is no normal coagulation. The use of Hansen's rennet is recommended. Care must be taken that jars or bottles are kept thoroughly corked, and tests periodically made to ascertain strength. Mode of testing will be described in a future paper.

Process of Making.

When Cheddar cheese is made in large quantities a portion of evening's milk is generally kept in the vat over night to be mixed with the morning's milk. When proper aeration cannot be accomplished it is necessary to cool

the evening's milk by means of a current of cold water passing around the steam jacket. Persistently stir as the milk becomes cooled, so as to facilitate the escape of foreign gases and the animal heat. Do not forget that straining every drop of milk through a fine muslin strainer is necessary prior to running into the vat. In the morning, and immediately before the addition of the hot milk, it is necessary to skim off the cream and heat it with a portion of milk. This is returned to the vat and thoroughly stirred down.

Adding the Color.—Color is added in sufficient quantities as to meet the demand of the market. The quantity at present averages about 3oz. per 100galls., which is too much, as decomposition of the coloring matter is very liable to follow in the matured cheese, and is occasionally attributed to failure in ripening. I have often found the objectionable taste of annatto in matured cheese. Coloring of the purest form ought only to be used, and in order to guard against discoloration it must be diluted with water and thoroughly incorporated with the body of milk; 1oz. of superior annatto added to 60galls. of milk at renneting temperature is considered a safe average. Such a quantity will impart to cheese a natural and inviting appearance.

Renneting.—Milk is renneted when it has attained the proper degree of acidity as indicated by the rennet or alkaline test. Temperature depends upon many circumstances governing the nature of the milk. The quantity of rennet to be used is of much importance owing to its checking influence upon the acid and hardening property upon the curd. It is erroneous to think that by the addition of extra rennet to normal milk a gain in cheese-ripening will be obtained. Amongst eminent scientists an opinion exists that the action of rennet ceases after coagulation. Renneting sweet unripened milk would retard the desired fermentation, and therefore prolong the cheese-making process. The chief influences of rennet are to coagulate the casein and retain in this thickened albuminoid the valuable fat constituents. The liquid albumen and sugar principally escape from the curd and pass away in the expelled whey. The composition of a well-matured cheese will indicate the absence of the above milk constituents, the latter substance becoming converted into acid by the lactic ferment. Generally speaking, rennet ought to be added in such a quantity as to render coagulation for cutting in about forty minutes; 1oz. to 30galls. of milk is sufficient, and stirring should continue for five minutes after renneting. At the end of ten minutes a little cream will have risen on the surface of the milk; stir this down with the finger, and afterwards cover the vat over with a clean cloth. Vibration of the vat during coagulation will cause loss in cheese.

Coagulation.—The stage of coagulation for cutting receives by far too little attention from many cheesemakers. It is this neglect which leads to the loss of casein and fat. Curd cut when too soft, with careless stirring, must result in the destruction of a percentage of the cubes, which means a loss of cheese. When the whey presents a milky appearance, instead of greenish, unskilful treatment of the curd has been principally the cause. By the use of the finger test a person can arrive at the proper stage of coagulation for cutting.

Process of Cutting.—Cutting is accomplished by using the perpendicular knife first and working lengthwise, taking care not to overlap, but to keep the outer or inner blade $\frac{1}{2}$ in. from the line of the nearest cut. Attention to efficient cutting of the curd adhering to the vat and in entering the knife in a careful manner is very often neglected. Crossing is the next operation, and at this point a great deal of damage is often done. Enter the knife with handle slightly towards you, and resting against the opposite side of the vat, the right or left hand blade touching the corner end, cut steadily, and upon nearing your own side gradually slant the knife backwards, the bottom first coming into contact with the side of the vat. In this position cautiously draw up the knife out of the curd, and continue the process. Care is required not to have an

accumulation of cut curd around the exit of the knife. When this happens cut partly across in order to reconstruct the line. The horizontal knife is now used. Carefully enter, having the handle slanted from you, and cut from end to end, overlapping one half at each operation. Do not turn the knife at the ends of the vat, and before removing give an additional cut around the outside of the whole curd; so that any large pieces previously escaping will come under the knife. In cross-cutting enter the knife in a similar manner, push it to opposite side, and draw backwards slightly quicker than with perpendicular knife. Overlap as found necessary as to size of curd required. Do not remove the knife until finished. Irregular cutting, like too soft curd, will cause loss in making, unequal cooking, and uneven ripening of cheese. It stands to reason that smaller cut curd will be more thoroughly cooked than larger cut, therefore drier and harder. In the larger cubes more whey will be retained, texture softer, and with a high scalding temperature a skin will be formed around the outside preventing the liberation of whey. In South Australia the majority of cheesemakers use the horizontal knife first, but to obtain regularity in size of cubes it is advisable to use the perpendicular knife first.

Stirring in Vat.—Finished cutting, the curd ought to be untouched for five minutes, followed by stirring with the hands for ten minutes. At the expiry of this time the curd will have firmed sufficiently to permit the use of the rake without damaging the cubes. Careful and efficient stirring is necessary, keeping the entire curd in motion and preventing lumps in the corner and bottom of the vat. Stirring should be continued until the curd particles are cooked so dry that when a handful has been pressed for a few moments they will fall apart as the result of any slight disturbance.

Scalding and Drawing off the Whey.—Scalding is resorted to fifteen minutes after cutting. The heating should be effected gradually at the rate of about one degree for every four or five minutes, until 99° F. is reached. The action of the heat is to cause contraction of the curd, and thereby expel the whey. Curd is allowed to settle down until the test indicates the proper development of acid, when the whey is then run off and curd removed to the cooler. To experienced cheesemakers smell and taste of whey is taken as a guide to maturity of curd in the vat. After the whey is drawn off the curd should be kept in the cooler at a temperature above 94° F. If it becomes colder than 94° previous to matting the development of acid will be hindered, and an excess of moisture will be retained during the matting process. The presence of such extra moisture in the curd at this stage will leave the cheese with a weak, pasty, or tallowy body, according to the degree of acid development permitted.

Stirring in Cooler.—Stirring is continued until whey has sufficiently drained, and the air allowed to permeate throughout the curd. The oxygen of the air exerts a check upon the acid, and the escape of gases is permitted. I am of opinion that a change in fermentation at this period takes place. Provision against cold draughts of air should have strict attention; as before stated, injury is caused by a fall of temperature at this important stage. The average time for stirring is seven minutes.

Matting.—The loose curd is piled into a corner, well covered, and allowed to mat. Close matting and packing is beneficial only when the curd is sufficiently dry and when aeration is provided for. At the end of one half-hour the curd is cut into square blocks, and is piled up one upon the other and covered. At the end of another half-hour a test for acidity is made with the hot iron. If fine silky threads of fully 1 in. long are obtained the curd is ready for milling. At this stage the curd should feel mellow, velvety, and slippery, and show a texture of passing from the flaky or leafy into the stringy and fibrous. Were we to find the threads drawing under 1½ in. turn the blocks again and cover. Continue testing at intervals until acid has fully developed. If too moist or soft the curd should be cut or ground at an earlier stage, and hand-stirred until dry enough

before the addition of salt. Hand-stirring for a short time should always precede the salting. Putting weights on the blocks in the cooler is found beneficial.

Salting.—The action of salt is to retard acidity and preserve the cheese. The quantity of salt to be used varies according to the dry or wet condition of the curd and richness of the milk. With rich milk and moist curd salt at the rate $2\frac{1}{2}$ per cent.; opposite conditions, fully 2 per cent. Immediately after the addition of salt the pieces of curd become harsh and gritty on the surface. With stirring ten minutes and piling up for another ten minutes the harshness gives place to a mellow condition. Stirring is continued for a short time longer, when the temperature of the curd is about 75° F.

The purest form of salt must only be used.

Pressing.—By means of the hands the curd is pressed tightly into the hoops. In each hoop there ought to be a rough cloth previously wrung out of slightly-warmed water. Cheese is now put into press and pressure gently applied, the weight of the screw being sufficient. Many a good cheese is destroyed by over-pressure in the first stage. By gradually increasing, at the end of two hours high power is put on. In the evening cheese is taken out, turned, and damp fresh cloth applied. Next morning remove cheese, bathe in water of 120° F. for one minute, and return to press in fine cloth. Put on slight pressure at commencement for a short time, followed by full pressure. By bathing in hot water a fine tough skin is formed around the cheese. When found convenient press for an additional night.

Ripening.—Ripening of cheese means a changing of the insoluble constituents, viz., casein into soluble albuminoid bodies. New cheese is very indigestible; the casein has not had sufficient time for the bacteria to render it soluble. In the curing-room the temperature is concerned with the period of maturity of the cheese. A high temperature is favorable to speedy fermentation and fast ripening; a low temperature is detrimental to ferments—therefore slow ripening. When rooms are not refrigerated in the hot summer months or without a cool situation a great deal of the cheese fat is melted down and lost on the shelves and floor of the room, leaving a hard unmarketable cheese. It is necessary to have a hygrometer in every ripening-room to ascertain the humidity of the air. Moisture acts as a preventive to cracking of the cheese. Spraying the floor with water when the air is too dry is recommended. For green cheese a good average temperature is 64° F., falling to 60° F. as ripening proceeds. Thermometers should be thoroughly accurate, as 1° wrong in the making of cheese is very often injurious. I have tested two thermometers over 2° too high and one 3° too low. Turning cheese daily until sufficiently firm is required by every maker, afterwards twice a week until removed from the ripening-room. Sizes of cheese preferred in the town market at present are 12lbs. and 25lbs.

Analysis of Cheddar Cheese and Whey (Voelcker).

	Average of Six Analyses	Eleven Months Old	Six Months Old.	Whey, per cent
Water	34.60	30.32	33.92	93.31
Fat	31.03	35.53	33.15	0.10
Casein	27.60	28.18	28.12	0.27
Sugar acid extractions	2.94	1.66	0.96	5.85
Salt	1.04	1.55	1.15	—
Ash	2.79	2.76	2.70	0.47
	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>

The loss by shrinkage in Cheddar cheese averages about 8 per cent. Following is given a copy of cheese record. By filling in the record a knowledge would be obtained of the conditions under which good or bad cheese is made. Many mistakes would be rectified were this carried into effect.

CHEESE RECORD.

Date Manufactured	Temperature of Moulding Room.	Gallons of Milk Used.	Time of Ripening. min.	Seconds Test or Acid Test.	Quantity of Coloring Used. oz. dr.	Temperature of Milk at time of Kneading.	Quantity of Kneading Used. oz.	Time when Added. a.m.	Time of Coagulation. min.	Temperature Heated to. ° F.	Time of Heating. min.	Time Settled in Whey. min.	Lbs. of Curd.	Quantity of Salt Added. lbs. ozs.	Time of Salting a.m.	Temperature of Curd at Pressing ° F.	No. of Cheese.	Temperature and Moisture of Ripening Room. ° F.	Remarks.
Pattern Record		170	60	19	2 5	82° F.	5	7-8	40	90° F.	60	40	175	3 6	12 0	73° F.	10	60°	Put into hoop rather acid.

Treatment of Fast Milk as compared with Normal Milk.—As fast milk has often to be dealt with it will be of value to enumerate the treatment throughout the making, and give reasons for the same. The aim of the maker is to check the acidity, and, if possible, have an advance upon it. Sweet unripened milk will necessitate opposite treatment in many respects. Development of more acid in the milk will overcome the difficulty.

Process.	Reason.
1. Rennet at two degrees higher than the usual renneting temperature, and add $\frac{1}{2}$ oz. more rennet to the 100galls. of milk	To bring about speedy coagulation.
2. Cut curd a little soft and decidedly smaller	To enable moisture to become more thoroughly expelled.
3. Raise the cooking temperature speedily and 2° higher — 101°	To promote rapid contraction of the cubes.
4. Run off a portion of whey during cooking	To decrease the acid and retard its further formation.
5. Run off whey sooner	To prevent over-cooking.
6. Stir a little longer in cooler	To admit the escape of moisture, and allow the air to exert its beneficial influences
7. When still too acid wash in cooler with water at 102° F.	To wash out the excess of acid.
8. Mill and salt quicker	To put an instant check upon acid development.
9. When practicable ripen cheese at a temperature under 60° F.	To render ripening slower, and aid in preventing hardness and dryness.

Cheese Faults and Causes.—

Discoloration	Principally found in cheese made upon the acid system, caused by too sweet curd and excess of whey. Ripening milk artificially and working into the Cheddar system generally overcomes the difficulty. High coloring increases discoloration.
Bitterness	Very often follows when curd settles too long in the vat, and when the milk is off boggy land. Quick fall of temperature in curd when first put into cooler.
Decomposition	Too sweet cheese and check upon ripening. Bad coloring matter, and salt. Impure milk, as colostrum. Insanitary condition of making and ripening room. Throwing water on curd to reduce the temperature. Salting curd in a matted condition.
Heaving	Ripening cheese too soon and at too high a rate. Hooping curd at too high a temperature and over-pressure at commencement.
Soft and shapeless cheese	High temperature of ripening-room at first stage of ripening.
Crumbly	Weak curd, produced by ordinary treatment of milk off limy and boggy soils. Finely cut curd of a dry nature put into press at too low a temperature and insufficiently pressed
Holey	Uncleanliness and want of aeration of milk. Not stirring the hot curd in cooler sufficiently. Too quick and uneven pressing at too high a temperature.
Dry, hard, and cracking	Excess of rennet and renneted at too high a temperature. Inattention to cutting and scalding. Stirring too dry in cooler at first stage. Excess of acid and fast ripening of cheese,

Process.	Reason.
Patchiness and uneven ripening ..	Irregular cutting, heating, and stirring in vat and cooler. By not using the McPherson mill. Careless salting and hooping matted curd.
Too much whey in cheese	Moist curd, insufficiently stirred in cooler, or water at a low temperature thrown on curd when taken out of vat, low salting, too hard pressing at the first stages.

It is a matter of difficulty to give accurate causes for many cheese faults, as similar conditions influence different changes. It would be of advantage to cheesemakers to carry out experiments without seriously endangering the cheese, and note the full working in the cheese-making record.

Points of a good Cheddar : 1. Flavor high and mild, full, nutty, and clean. 2. Color natural and even, free from discoloration. 3. Cut clean and not waste. 4. Not leathery or mealy. 5. Smooth surface, fine skin, and even in shape.

Moulds.—Cheddars which grow white or yellow moulds generally contain too much whey. Blue mould is an indication of well-ripened cheese.

American or Acid System—As in Canadian Cheddar cheese making the same remarks may apply to the acid system, but insufficient acid is allowed to develop, and the curd is hooped in a loose and unavoidable moist condition.

FARM NOTES.

Written for the "Journal of Agriculture and Industry."

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During the past month we have been using the horse hoe on wheat or peas as often as the weather permitted, and we will continue the work for some days next month. The horse hoe, as adapted for the hoeing of such crops as wheat, is as yet very rare in the colony. Forms of hoes which take the space between two rows of plants only are numerous enough for work on such crops as potatoes or mangolds, but hoes suitable for the hoeing of, say, wheat drilled 8in. between the rows are rare indeed. There are some cultivators in the market which take the full width of the seed drill, and can be adjusted to work as many rows at once as the drill has sown, provided the distance between any two rows is considerable and the drilling has been straight, but as they have no steerage apparatus with which to counteract the deflections or wobbling of even the steadiest horses, they cannot be safely worked with the hoes or tines in any way close to the growing plants, and cannot be used, for example, in wheat or peas drilled at 8in. or 10in. between the rows. Now that drilling is so extensively practised it is likely that a demand will arise for steerage horse hoes, and implement makers and agents in the colony may find it worth their while to give attention to forms of this implement. It is not anticipated that more than a fraction of our wheat area will ever be horse hoed, but several other crops should be invariably hoed, such as peas, sorghum, &c., and accordingly when the suitable implement is available there will be purchasers for it. It happens that the wheat reaches the period of its growth when it is fit for hoeing at a time of the year when in average seasons the land is too soft or water-logged to allow of horses being used on it. This will always interfere with the practice of horse hoeing here, for when a spell of weather comes when the land is dry enough to carry teams without damage the horse hoe is not sufficiently expeditious, and farmers are forced to harrow instead or to use both implements if available. The steerage horse hoe, as it now is made, is more effective in stirring the surface of the land and in killing weeds than the harrows, but the work is, of course, more costly, as a man and

a boy will horse hoe only ten to twelve acres a day with two horses. A good horse hoe like Garrett's improved lever hoe is defective in some respects for South Australian conditions. The fields in which we have been working the hoe exhibits various textures of soils from light sand or light brashy limestone to clay loams or stiff claypans. When the hoes are given a "pitch" sufficient for the clay they go too deeply in the brush or sand and tend to bury the plants and when adjusted for these latter they fail to touch the baked clay surface. It is impracticable to stop and adjust as often as the land varies, and some simple means of regulating pressure on the hoes and altering the pitch while the machine is in work, similar, perhaps to the mechanism on the drills as now made, or even similar to the less complicated arrangement of the Massey-Harris cultivator would much increase the utility of the implement. Careful horse hoeing opens the surface and assists in the retention of moisture, helps to clean weeds, more especially such bottom weeds as dandelion, chickweed, and poppy, and gives renewed vigor to the crop. The operation can readily be done for 1s. an acre or less, and the outlay is much more than refunded by increased crop. Harrowing is good, and as horse-hoeing the whole crop is impracticable, though more beneficial, it is well to horse hoe as much as possible and rely on the harrows to take the remainder of the wheat area. It is only in the case of wheat that the difficulty arises; spring and summer crops, such as pease and sorghum, should be horse hoed.

The season promises to be good for summer crops, and a portion of the fallows should be sown with sorghums, pie melon, maize, or Johnson grass. I do not think it desirable or good practice to crop more than a fraction of the fallows, for bare fallowing has everything in its favor in this colony. Here I would differ from our worthy editor, who in last month's notes spoke of bare fallows as a "delusion and a mockery," and argued that the experience gained in other countries should apply here. I am afraid our editor does not read his Old Testament carefully; otherwise he could not have overlooked the wise counsel of Job, "Speak to the earth and it shall teach thee." The experience of other countries is only of use in helping to read more accurately the lessons which our soils and climatic conditions teach. Our practice has to conform to the conditions, and he will be unfortunate who adopts practice followed elsewhere and growls at the climate in that it is unsuccessful. The deficiency of moisture from which our great wheat-growing areas suffer is reason enough in favor of fallowing bare a considerable area each year, and there are others not necessary for me now to enumerate. For the most favored areas the case is different. Fallow crops, I think, might be the rule there and bare fallow the exception. In Notes for September last year I indicated crops which, I think, may be grown profitably as fallow crops in these districts, and will not repeat now.

The season is proving most favorable for cleaning land, and every effort should be put forth to clean fallows thoroughly next month. A like chance may not occur again for many years.

A GOOD WORD FOR THE WOMENFOLK.—Professor H. H. Dean, Ontario Dairy School, says: "Men are naturally untidy, slovenly, and dirty in their habits. Women, on the other hand, are naturally cleanly and tidy; and if there is any man who is clean and tidy in his habits I will guarantee that in ninety-nine cases out of 100 he owes it to his mother, and not to his father. . . . Every cowshed ought to be whitewashed at least once a year. . . . There are enough men sitting around holding down chairs in the kitchen and getting in the way of the women to keep all the cowsheds in the country clean and to have them whitewashed once a year. All the mangers and stalls should be whitewashed three or four times a year."

GRAFTING FRUIT TREES.

A LESSON FOR BEGINNERS.

BY GEORGE QUINN.

Anyone who has visited orchards in various parts of this colony cannot fail to note the immense numbers of useless varieties of fruit trees found in them. One is led to believe the presence of these to be largely due to a want of knowledge on the part of the owners of the simple forms of grafting. Owners of pretty large orchards have frequently informed me they had been compelled to engage a gardener living many miles distant to insert a few grafts, and after incurring this expense the lack of skilled treatment afterwards had practically rendered the whole work valueless.

Grafting may be described as the operation of inserting a scion—a twig comprising one or more buds—into a stock, which possesses or consists entirely of a root system ready and capable for absorbing moisture and nourishment.

The scion is usually, but not always, inserted into an incision made in the wood. The chief object of grafting is to change an undesirable variety into one that is more valuable for the purpose in view. By means of grafting a return can be obtained in a lesser time than would be possible by planting a young tree. It is superior to a seedling in that a graft reproduces all the characteristics of the parent tree. With the exception of a cutting, it is the only known method by which an exact counterpart of the original plant can be obtained with certainty. It also enables the grower to increase or diminish the robustness of growth by using stocks suitable for either purpose. By grafting scions from them upon older stocks seedlings may be fruited, and thus tested much quicker than otherwise, and by the selection of certain resistant stocks the injuries of various insect pests may be avoided.

There are many methods of grafting and endless modifications of these, but the cardinal principle to be observed is the same in all. To effect a union of scion and stock the sap carrying layers of tissue—technically known as the cambium layers, which are located just beneath the bark—must be pressed in close contact to the exclusion of the air and all other substances.

It is not essential that these layers should meet exactly all the way around the cut surfaces of both scion and stock, but it should be carefully observed that the greater area of cambium on each which can be brought in contact the more certain and rapid will be the complete fusion of the tissues of stock and scion. It is the observance of this general principle which has caused so many methods to be devised for adjusting the scions and stocks, for experience has taught that it is only in these cambium layers that union takes place. The woody fibres do not unite. It is important to note this, as the presence of a dead or inert substance within the heartwood of a tree, even when the wounds of grafting have healed to all outward appearances, is certainly a source of weakness and menace to the stability of the trees. With a knowledge of this the operator should always select that form of graftage which does not leave a large quantity of this inert matter attached to the scion, or wound the stock unnecessarily in making the incision to hold the scion. The scions should consist of growths of the previous year. They must be well ripened and fibrous, not brittle and pithy. To avoid the latter defect the few buds at the top of the shoot should be discarded. The scions must be cut in the winter, or before the buds swell in spring. Only scions from trees known to be good regular croppers should be used. The scions are preserved best if buried in moist—not sodden—sand, in a cool shady place, as it is desirable to retain them in a dormant state.

The stocks may be roots, young plants, or old trees. These are not prepared in any way until the time arrives for manipulating them and inserting the scions. By this it is intended that roots shall not be dug or tops cut off trees until they are to be worked. Root-grafting (as shown in Plate I.) is usually performed while the stock and scion are still dormant in late winter. Grafts made above ground are completed, as a rule, in early spring, just when the sap starts to move in the trees (these are represented by Plates II., III., and IV.) Bark grafts can only be inserted when the sap is sufficiently abundant to permit the bark and wood separating readily, as is required in budding, or bud-grafting. Plate V. illustrates this section.

Grafting, as dealt with in this article, is usually applied to the propagation or renovation of apple, pear, plum, and olive trees. Stone fruits are invariably budded, although the methods described herein may be safely used on them when absolutely necessary. Citrus fruits are also bud-grafted.

Excepting in the case of quince stocks when used for dwarfing pears, it is always advisable to work each sort upon stocks of its own kind, viz., plum on plum, pear on pear, and apple on apple.

To exclude the dry atmosphere and all foreign substances from the point of union or contact of cambium layers, and prevent the drying up of the sap at this section, a coating of some adhesive substance is necessary upon all grafts made above ground. A rude grafting wax or paste can be made of two parts clay, one part cow manure, and a little hair. The former ingredients are pulverised and worked into a plastic condition by the addition of water, the hair being finally incorporated. A thick coating of this will give fair results if only one or two trees are to be grafted, but in commercial work it is now discarded and replaced by waxes, which are less bulky, less liable to crack or be washed off, and more readily manipulated. The waxes are chiefly composed of resin, beeswax, and tallow. The following is an approved compound:—Resin, 3lbs.; beeswax, 2lbs.; tallow, 1½lbs.; turpentine, 4ozs. These ingredients are broken into fine particles, melted together over a fire, the turpentine added afterwards, and are then ready for use, but care must be exercised in applying hot waxes to the tender bark of a bark-grafted stock, such as the olive. For this reason some of the alcoholic waxes are preferable on soft bark. Lefort's liquid grafting wax is given here as in Professor Bailey's book:—Resin, 1lb.; beef tallow, 1oz.; dissolve over fire, and when dissolved remove from fire and add 8ozs. alcohol. Keep in close-stoppered bottles or tins.

When waxes are applied hot a brush is used, but when bandages are applied to small stocks the bandages or cotton wicks are saturated in the hot wax and wrapped on, remaining in its position without a tie. The ball of wick cotton may be put in the hot wax and saturated prior to being used, or the narrow strips of calico can be wound around a stick and thrust into the liquid wax in a similar manner and be unwound as required. The tools used for the work, of course, are variable. Besides a saw, a good broad chisel, and a mallet for large cleft grafts, a strong sharp pruning knife will do for the purposes of cutting scions and making incisions in all small stocks.

Explanations of the Plates.

PLATE I.—Fig. 1 shows the prepared stock and scion, the former consisting of a piece of root about 4in. long and the thickness of a pen handle. Above it stands the scion, a piece of twig about 6in. or 8in. long. These are desirable lengths. The top of the root (stock) and base of the scion are cut off obliquely, showing a section which may be from ¾in. to 1½in. long. About one-third of the length—from the top of this section in the stock—a downwards slit is made, and a corresponding slit made the same distance from the base of the section on the scion. When the two oblique sections are placed together as depicted

in our illustration, the tongue of the stock will slip into the slit of scion, and *vice versé*. This is called a *whip and tongue graft*. A very firm mutual grip is thus obtained. This method is usually adopted when rootstock and scion are approximately of the same size, although this is not necessary if the sap layers on stock and scion meet for a fair distance along one side.

The junction is then bound around as, shown in Fig. 2, with candlewick or calico strips, or other material that will rot away pretty quickly, no waxing being necessary as the grafts will be deeply buried in the soil.



PLATE I.—TWO FORMS OF ROOT GRAFTING.

Fig. 3 represents another method of root-grafting, the stock and scion being ready for adjustment. This method is used when there is a greater difference between the sizes of the root stock and scion. It is a very economical process using up many small roots; in fact, pieces of roots no larger than our illustration can be utilised.

The top of the root is cut wedge shape, and a shallow upward sloping incision made in the side of the scion, just above the base; into this the root-wedge is thrust, as shown in Fig. 4, care being taken to fit the sap layers on one side at least of the stock and scion.

The budding is done as in the other case. This latter method permits kinds inclined to root from the base of the scion to do so freely. The much-

prized Northern Spy apple roots strongly in this way. The grafted plants are inserted in the soil to the depth shown by dotted line A in our illustration. This only leaves one bud above ground.

In actual practice the roots should be dug up, washed, and carried into a shed where there is a bench to work upon. They are then cut into suitable lengths, trimmed, and sorted into sizes. A sharp seccateur or keen-edged pruning knife should be used. Every precaution must be taken to keep the roots moist—wrapping in a wet bag being a simple method.

Having the roots and scions prepared on the bench the operator joins them by the method explained, and ties the joined sections.

The grafted stocks may be either planted out at once or kept for a while in damp loose sandy earth. If planted in nursery fashion the rows should be 2ft. apart, and the plants from 9in. to 12in. distant in the rows. The solitary bud left above ground is alone permitted to grow to form the future tree.



PLATE II.—NURSERY GRAFT.

This is the method pursued to obtain blight-proof apple trees. The root and scion *both* are from a blight-proof kind—preferably Northern Spy—and after the resulting shoot has attained a sufficient thickness a bud of the variety desired is inserted, not nearer than 6in. to the surface of the soil. This height for budding is advocated to prevent adventitious roots being sent out by the budded variety, which is, most likely, not blight-proof. With the exception of the propagation of apple trees root-grafting is not used to any extent in South Australia.

PLATE II. represents a graft used upon small stocks. It is a whip and tongue method, made as described formerly, and adjusted so that the cambium layers meet only upon one edge, the remainder of the stock being sloped off to

assist in making a less ugly joint when healing. This is shown in Figs. 1 and 2. Fig. 3 shows the joint closely wrapped in waxed cotton wick to exclude dry air, &c. This graft is applicable to young shoots on old trees after being cut back a season, or upon young nursery stock, say up to two years' growth. It is made at any required height above ground, and effects a good union.

PLATE III. shows a form of graftage known as a split or cleft graft, with a single scion. It is applied to stocks of about 1 in. in diameter. Fig. 1 shows this scion prepared for insertion into the split in the stock. Fig. 2. depicts the stock as seen from the side opposite to the scion, and the ugly, dangerous split can be readily observed. This stock is also sloped to facilitate the healing

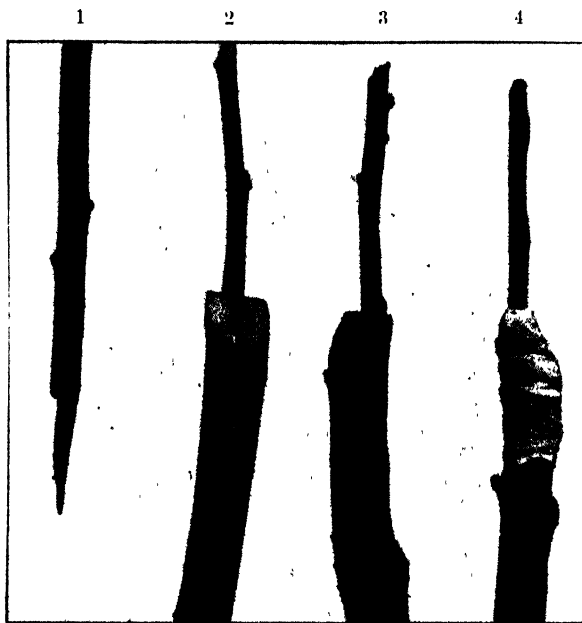


PLATE III —SPLIT OR CLEFT GRAFT

process. Fig 3. shows the scion inserted ready for tying. It can be seen how the barks of stock and scion are fitted. Fig. 4. represents the stock and scion fitted and tied with a waxed band. It is not a very desirable form, as the split never properly heals, though it may be overgrown.

PLATE IV. represents the split or cleft graft as commonly applied to large old stocks. Fig 1 shows the stock as split and held open with a chisel until the scions are inserted. After the split is made, should its edges be bruised or jagged, they must be carefully trimmed and smoothed with a sharp knife. Figs. 2 and 3 show the scion with the outward (bark) edge and the inner wedge-shaped section respectively. In Fig. 2 it will be seen that a bud is located just at the point where the section begins. Behind this bud a shoulder is made, which rests upon the horizontal surface of the stock when inserted in the cleft. When the scions are adjusted into position, the wedge or chisel is withdrawn, and the stock closes back and clamps the scions firmly. They are then tied, and the whole cut surface from the lowest point of the cleft section on the stock upwards is carefully waxed to exclude dry air, moisture, and germs of decay. A good number of scions may be inserted in this manner around a large stock, but the

method of split-grafting is not conducive to the best health of the tree for the reasons advanced in respect to the last-named modification of it, as applied to young stocks; in fact, in the case of a large tree stock the defects are more aggravated, and the chances of a complete healing much reduced.

PLATE V. depicts a form of bark-grafting. Fig. 1 illustrates a large stock with an incision made in the bark ready for the insertion of the scion, which is shown (Fig. 2). It will be seen that this scion is cut with a horizontal section through three-fourths of the diameter. From this point the cut is sloped away to nothing at the lowest point. From the opposite side—that is, the bark side—a downward cut is made which makes a wedge point to the scion. A bud is located about half way down this reduced portion.

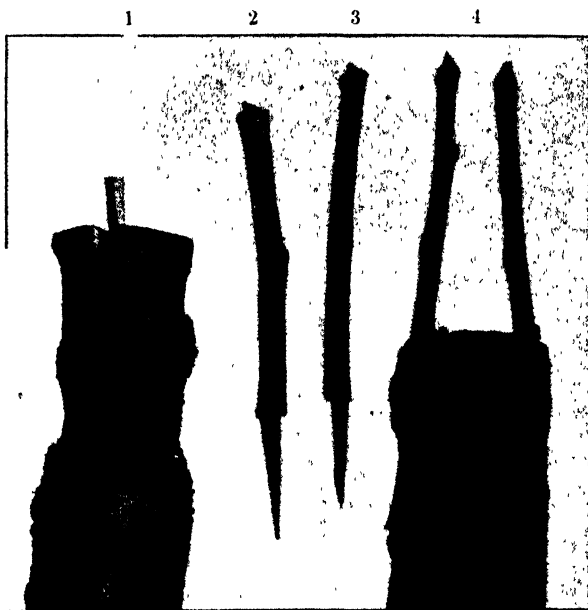


PLATE IV.—SPLIT OR CLEFT GRAFT.

When the scion is pushed down into the incision made in the bark of the stock the shoulder rests upon the horizontal surface of the stock, and the bud upon the reduced section is about an inch below, merely projecting into the incision. The reason why the point of the scion is made wedge-shaped is because it may be pushed down into the incised stock without the bark from the base of the scion being bruised or crumpled back. This wedge-shaped point also facilitates the operation. The reason why the bud is embedded in the incision in the bark of the stock is an assurance against the work and season being lost should the top of the scion be broken away. If this does not occur the embedded bud remains dormant. After the scions are inserted a string binding is passed around them to secure them in position, and wax is painted over the whole surface operated upon, as in the case of cleft-grafting. Fig. 3 illustrate this when completed.

Bark-grafting has many advantages over the cleft-grafting. It does not injure the stock so permanently, and makes a better union, a greater number of scions can be inserted around a large stock, and the results may be seen sooner. It is performed a little later than the other methods, and can only be

done when the bark of the stock lifts readily from the wood—that is, when the sap is in active motion.

The after-care of the grafts is an important matter, and I will take them in serial rotation. Root grafts will require no loosening of the ties, but all the buds, excepting the top one, should be suppressed. If it is intended to shape the trees in the nursery rows, when this shoot attains a height of 18in. it should be cut back to 12in., and a number of shoots to form the main arms of the tree will grow out. If the tree is to be budded—as in the formation of blight-proof apples—allow the shoot to grow straight up, and in the proper season insert a bud at a desired height—not less than 6in. from the ground—of the kind required.

The graft illustrated in Plate II. should retain its bandage closely for several months. All shoots below the union should be suppressed.



PLATE V.—BARK GRAFT APPLIED TO LARGE STOCKS.

The cleft graft in Plate III. requires more careful attention to the binding, owing to the wounds being more severe and taking longer to heal; in fact, the sections near the union should be kept waxed or closely bound until the wounds are healed over completely.

In Plate IV. the cleft graft upon an old or large stock requires still more careful and lengthy attention. All shoots below the union should be removed as soon as seen, and each winter for several years a fresh coat of wax should be painted over the wounded surface. Should more than four scions grow upon a large stock they should be reduced to this number, and as they grow and swelling touch each other at the base an incision made where they touch and waxed over often causes fusion into one stem. Grafts set on old large stocks should be supported when they begin to grow by tying them to a bamboo or stake fastened straight up along the stock and projecting beyond the graft a foot or more. There is no need to untie the binding strings; they decay soon enough.

All the remarks applying to the after-treatment of the cleft graft apply to the bark graft also.

PRUNING CITRUS TREES.

BY GEORGE QUINN.

I am frequently asked by correspondents and others for a given rule to follow in the formation and pruning of citrus trees.

There may be many methods of pruning citrus, but it is rarely indeed one meets with two growers who will agree upon a system; very many more will be found to acquiesce quietly in the policy of "letting them alone."

Fairly good results are even obtained by those growers, but I am disposed to think their methods are far from being the most desirable.

The citrus family—I refer here more particularly to the orange and lemon trees—appear naturally to take the form of an arborescent shrub rather than that of a tree with a clearly defined trunk. Unlike those trees that naturally



PLATE I

form single stems which stand exposed to the sunshine and weather effects, the citrus trees do not shed scaling bark such as that which clings and affords protection from the elements to the limbs of nearly all trees of erect growth. If left to themselves entirely they form pendulous branches, which not only shade the limbs and stems, but the ground for a considerable area around.

The members of the family, under ordinary methods of cultivation or neglect, are surface rooting; thus this shading habit is of great value in a hot climate in keeping the ground cool.

Whether these premises are truly scientific or not is, no doubt, open to argument, but as I have noted the methods advocated here—based on the assumption that they are correct—in long and successful use in various parts of Australia, it can be claimed that they are neither original or untried.

The shaping of a citrus tree should begin in the nursery, but unfortunately in this colony they are usually allowed to grow untouched. When a vigorous

growth from the bud takes place, say, to a foot and a half in length, it should be shortened back to induce branching; if it branches at a foot from the bud joint without topping so well and good.

When branches start, three making equal angles from the stem should be selected and encouraged, not, as in the case of deciduous fruits, by the removal of all others, but simply by pinching the points out of any rivals if necessary, but often such precautions are not required.

In PLATE I. I have photographed a young orange tree about 4ft. 6in. high, a fairly good type of a tree planted out two years from the nursery. It will be seen that it has branched out about 10in. from the ground. Three main branches are formed and a number of weaker ones; the tree has had no pruning beyond removing an occasional crossing shoot; the stem is well sheltered and the branches are spreading out nicely, forming a fair shade for the extending

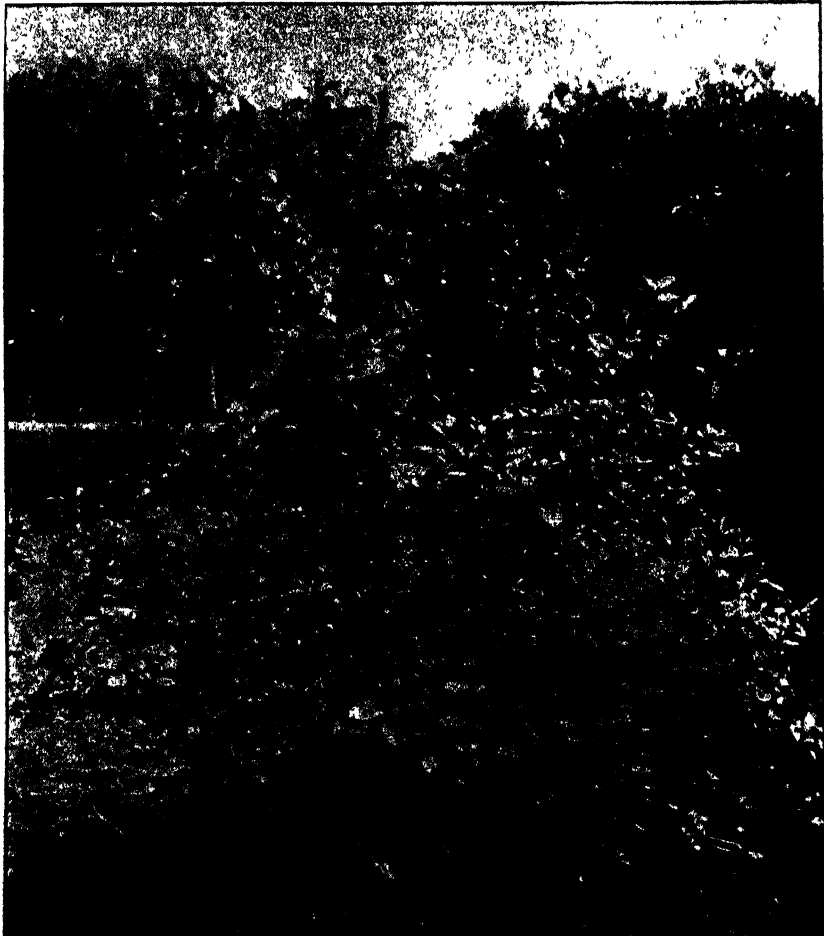


PLATE II.

root system. At this stage no pruning is recommended beyond the removal of cross shoots, which threaten to displace the main growth. Should any rank water shoots emerge and threaten to upset the balance of the tree they will be

cut clean away from the point of insertion. In all probability the next season this tree will produce a few fruits upon the lower and old branches, and as the fruits are borne upon the latest growth they will be near the points of the limbs on which they are borne.

PLATE II. represents a lemon tree having come to the stage when fruits are borne. The lower branches have carried some fruits, and have in consequence been bent to the ground, and now that the fruits are nearly all removed are stiffened into the pendulous position.

Immediately above these prostrate limbs are other branches, upon the laterals of which a great number of lemons are set (too small to be depicted in the photograph). As these develop they will occupy the place now occupied by the lowest branches, with the result that those lowest at present will either be lying on the soil or be propped in a tangled mass amongst those immediately above.



PLATE III.

PLATE III. shows how this can be avoided. The lower shoots from the bottom branches are removed. Tangled growths—carrying a good many young lemons, too—are also removed, space being left for the further development of

twigs and fruits. If Plate II. be again examined a number of vertical shoots will be seen growing from the horizontal branches. In cutting off a branch it is usually cut outside one of these erect shoots, thus controverting the pendulous habit to a useful degree.

The remainder of these erect shoots are shortened back to firm wood to induce them to branch later on into fruit carrying laterals. If any rank water growths threaten to outstrip all other shoots they are either suppressed entirely or shortened in. I prefer to suppress them excepting when they are required to balance the tree.

It will be observed that this lemon tree has been allowed to branch about 4in. from the ground, but in the course of a few years I would suggest the two side limbs be removed and the tree poised upon a single stem, which is about 18in. high, but this will be done gradually as the crown of foliage is widened.



PLATE IV.

PLATE IV. is a photograph of an orange tree about 40 years old. It is 16ft. high and nearly 20ft. through the widest spread of the foliage. At 15in. from the ground it has formed three main branches, which have been allowed to branch again immediately.

Standing inside against the main stem one can see all the main and sub-main arms as clearly as one can see the ribs when beneath an umbrella, but the almost unbroken canopy of foliage which surrounds one on every side effectually breaks the burning rays of the summer's sun.

No water shoots are permitted to grow upon these internal arms, and all the fruits are borne upon the twigs out in the full daylight. The foliage reaching within 2ft. of the ground for a radial distance of about 10ft. from the stem allows no burning sun-ray to fall upon the thin bark.

All dead wood and twigs are cut out each season. The pruning away of living wood and thinning out of dense growths are performed in early spring. All large wounds made by saw cuts are smoothened with a sharp knife, and covered by paint or grafting wax immediately to prevent injuries by weather or disease and facilitate the healing of the wounds. A citrus tree trained as described herein is less liable to attacks of insect life for the simple reason that the dense internal shelter so necessary for most insect life is lacking. Should the pests obtain a hold, the work of spraying or otherwise treating them is rendered easier and more effective. As remarked in the early portion of this paper, these trees even when left entirely alone frame themselves into fairly shapely trees; but the most crying neglect found in citrus groves in South Australia is the want of pruning away dead wood. "It takes too much time" is the ever ready reason, and so is allowed to go from a few dead twigs to an unsightly profitless mass, and from dead tips the canker spreads slowly but surely until the tree dies prematurely.

I wish to place this matter of dead wood to any reader who may own citrus trees in this manner: It will take from five to seven years to bring young trees into good bearing. Very little time would be required to keep this dead wood cut out if taken from the beginning and pruned out each season—"the better kept the easier" should be the motto. I venture to state if this matter be attended to it will in many instances add seven years longer of fruiting age to most citrus trees, which would compensate for time spent in its application. It also occupies space which should be filled with living shoots bearing fruits—at the top usually finest fruits are borne. The hard, dead twigs often prick or rub and thus ruin adjoining fruits. In the detailed matter of thinning out twigs it should be borne in mind that these trees produce fruit upon the current year's growth, that is, the twig grows, blooms, and sets fruit at once. It does not make shoots which develop fruit buds, which in turn, after a period of rest, open and set fruits, such as is done by the peach or apricot.

THE VINEYARD.

NOTES AND HINTS FOR SEPTEMBER.

Written for the "Journal of Agriculture and Industry."

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

During the early portion of this month the second ploughing should be terminated and the scarifiers set going. Wherever the soil has been cultivated well and thoroughly during the winter it will be unnecessary to send the scarifiers to any great depth, excepting where the growth of weeds is sufficiently luxuriant to render such a practice necessary. In general, deep cultivation given in spring or summer must be looked upon as injurious to plants; it brings about the destruction of the new root fibres that are rapidly being formed, in many cases weakening plants to a dangerous degree. Those, therefore, who have neglected to avail themselves of the advantages of deep winter cultivation cannot now take advantage of it until the following season. The

spring and summer cultivation that should be initiated this month should consist of constant shallow scarifying, with the object of destroying weeds, levelling the soil and maintaining it loose and open.

On an average September is probably the best month for grafting, and those who have kept any scions should set to work as soon as possible. Those who have no experience in the matter I would warn against the effects of deep grafting; never graft deeper than half an inch below the average level of the surrounding soil. Mound the soil over the graft, placing about an inch above the last bud of the scion. This practice readily protects the exposed tissues from desiccation and ensures the take of the graft. Never use grafting wax or clay; it is altogether unnecessary for underground grafts.

In most districts the vines will soon be budding, and growers should be on the look out for any return of cold weather and late frosts. Dense clouds of smoke will effectively protect the shoots of young vines from the effects of ordinary hoar-frosts. It is necessary, however, that the smoke be generated in sufficient abundance before the mercury of an exposed thermometer placed on a level with the shoots has sunk to freezing point, and that it be maintained for an hour or so after sunrise.

ORCHARD NOTES FOR SEPTEMBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

The favorable season has resulted in a great growth of weeds on most orchard lands. The time has now arrived for cross ploughing on a shallow furrow, taking care to turn these weeds under completely. As the month progresses in the earlier orchard districts it may be necessary to put the cultivator on to break the soil down into a state of fine tilth before the increasing power of sun-heat bakes the sods too hard. In impoverished orchards quickly soluble manures could be worked in now. Superphosphate, sulphate or muriate of potash, and sulphate of ammonia are types of these. From 3lbs. to 6lbs. of the former, according to the size of the tree, will be a fair dressing. Sulphate of ammonia is used chiefly to restore the rich healthy green color to the foliage. It is a strong compound and should be sown very thinly. One pound would be enough to apply to the space covered by a pretty large tree. Of sulphate or muriate of potash 2lbs. per tree should be sufficient to make an appreciable difference.

As newly-planted deciduous trees—that have been cut to a single stem—bud out they should be gone over carefully and disbudded to locate the shoots, which will ultimately be the main branches. With apricot and apple these buds should not be permitted to grow out too closely to each other along the stem, for when they attain large dimensions close grouping is a cause of weakness.

The grafting of deciduous trees will be well under way. This is dealt with in a separate article. The planting of citrus trees will now be in progress. These trees should be moved when about to start growing rather than after young shoots are put out. If large trees are moved and the soil shaken off accidentally the roots should be pruned with a sharp knife and the tops reduced very much after the manner of pruning deciduous trees. These trees always stand assured against collar rot if planted high up. On newly-trenched ground the mounds may be nearly a foot high, as the subsidence of soil will then leave the crown well above the surrounding surface. To any one about to plant citrus trees let me ask them to carefully test beforehand the natural drainage of the soil and consider the advisableness of artificial draining should

the natural outlets for water be imperfect. I take it my readers know how to set out the trees and the subsequent watering and staking where the latter is necessary.

If a windbreak is not provided, either naturally or artificially, do not plant citrus trees.

In the September issue of 1897 a list of varieties and an illustrated article on planting citrus trees was printed.

For the treatment of fruit pests I wish to refer to my notes of last month.

NOTES ON VEGETABLE-GROWING FOR SEPTEMBER.

BY GEORGE QUINN.

The sowing of cucumbers, melons of all sorts, marrows, pumpkins, trombones, and gourds will be general during this month. All of the members of this family of plants are extremely partial to thoroughly decomposed vegetable humus; consequently it is a good plan to bury deeply all the weeds of the garden beneath the ground intended for the future planting of melons. Well-rotted stable manure makes a good substitute, but it should be buried pretty deeply, so that the roots may be strong ere they come in contact with it; in other words, they should be in a fit condition to use the gross nourishment when they reach it.

In shady situations sow small beds of radish, lettuce, and cress for salad purposes, and continue doing so each fortnight to maintain a supply.

Stake up peas, and stir the soil between the rows. It is asserted that pinching the points out of the broad bean plants will hasten the setting of pods.

Transplant and thin out beets of various kinds.

Make sowings of dwarf and runner beans. Soaking the seeds in hot (not boiling) water hastens the germination. A simple plan is to pour the hot water—just hot enough to forbid one holding a hand in it—over the beans, and allow them to soak two hours. Pour off the water, and permit the seed to dry for half an hour. This latter precaution prevents them peeling and dividing when being sown through the fingers.

Always cover the seeds with about an inch of fine manure—not necessarily rotted; this does not cake, and allows an even sprouting to the germinated seeds. In mild situations cucumbers can be put out at the end of the month, but should be sheltered at night.

Tomatoes will be planted out, and should be well sheltered for some weeks. An old kerosine tin split in halves lengthways in a diagonal manner, retaining the top on one and the bottom on the second half. This is placed to form a roof and two sides against the prevailing cold cutting winds.

The planting of onions may be proceeded with, and sowings of pickling onions made very thickly to ensure the stunted sizes necessary. Wood ashes form a very desirable dressing for onion beds. Successional sowings of tomatoes should be made in protected seedbeds.

The ground should be stirred constantly between the rows of growing vegetables, working in quickly-dissolving manures as desired.

TYMPANITIS.—This is called “bloat,” “blast,” “hoove,” “blown,” &c., and is caused by rapid development of gas in the stomach of horses, cows, sheep, through eating ravenously of wheat, clover, or other food which ferments quickly. The remedy is to administer at once a tablespoonful of carbonate of soda in a pint of water to grown-up cattle or horses, and lesser quantities to smaller animals.

WEATHER AND CROP REPORTS.

AMYTON.—The weather for past six weeks has been all that could be desired, showers and sunshine alternating in quick succession; the crops and pasture have made splendid growth; rain from July 14 to August 24, over 3in. Fallowing general; stock improving in condition. With moderate rain next two months at least a fair harvest is assured.

ANGAS PLAINS.—Rainfall for five weeks ending August 22, 2.02in. Crops looking fairly well, but require more rain. Fallowing about finished. Frosts have been severe.

ANGASTON.—Every prospect of a good season. Seasonable showers during month, but sharp frosts have retarded the growth of vegetation. Feed plentiful, and stock in splendid condition.

BALAKLAVA.—Since last report we have had nice soaking rains with bright sunny days and sharp frosts at night. The feed and wheat are growing fast and looking well; some crops are coming out in head. Fallowing is drawing to a close. Aphis is beginning to make its appearance on the peach trees.

BORDERTOWN.—We are having frosts now, after such a heavy rainfall crops are looking healthy, but backward. We require some fine warm dry weather. An all-round heavy percentage of lambs is expected in the district; there is plenty of grass.

BRINKWORTH.—Rainfall for year to August 1, 10.81in; a little in advance of last year's record. Feed and wheat are growing well; nice rains about middle of month.

CARRIETON.—We have been favored with splendid rains. feed and crops growing well, and if September turns out well there will be a fair harvest.

CLARENDON.—Splendid season so far, hay crops and grass growing fast during the warm weather we have had. Potato-planting finished under favorable circumstances.

CRYSTAL BROOK.—Crops looking fairly well, but a good downfall is needed. On most farms the drilled crops are far in advance of the others. [Nice soaking rains have fallen since this report was written.—Ed.]

DAWSON.—July and to August 27th very dry; total rainfall, 1.16in. Crops very little better than at same time last year, and without very favorable weather the harvest will be light. Owing to so much seed maling and to dry seeding crops are thin and weedy, and there is no prospect yet of a hay crop. Pasture good, and stock are able to make a good living, but owing to nature of feed it will not stand much warm weather. Permanent grasses are very thin and will take a long time to recover.

DOWLINGVILLE.—Prospects still continue favorable, crops are making good growth, especially where drilled in, and the early sown are coming into ear. Feed is plentiful and stock in good condition. A large area is being fallowed.

INFERMAN.—We have had four sharp frosts in succession, which have nipped the blade of a good deal of the more forward crops, which show the need for rain.

KAPUNDA.—Crops look well, feed is abundant, and stock in good condition.

MOUNT PLEASANT.—Rainfall for July, 3.64in. Stock thriving, and season very favorable, though there has been rather too much rain round here for the crops, which are making no progress. Crops on Murray Flats looking splendid.

MYLOR.—Green feed is looking well, but owing to heavy rains and cold weather the crops and vegetables make slow progress. Some of the pea crops look very well.

NANTAWARRA.—Rainfall during month has been light, and severe frosts prevalent. Stock of all kinds in good condition, and some lambs sufficiently forward for market.

NARACORTE.—Every prospect of a good season. Crops looking well.

PINE FOREST.—Splendid rains during month. Wheat is making good progress, especially the early sown, and the season generally is one of the best experienced. Stock in good condition.

PORT ELLIOT.—We are experiencing good growing weather, but, with the exception of June, the winter has been somewhat dry. Only one severe frost has occurred, consequently feed has been fairly plentiful.

PORT GERMERIN.—The month has been rather dry, and some of the early sown and luxuriant crops are showing the effects of the weather. A good many crops are now coming into ear, and a good fall of rain is wanted to force the crops on.

PYAP.—Crops still looking healthy, notwithstanding the dry weather. Rainfall for month ending August 15, 0.33in. Stock looking well, though feed is not too plentiful.

REDHILL.—Crops growing vigorously, especially those manured. Stock in good condition and grass plentiful. Several severe frosts lately, and rain is now needed.

RICHMAN'S CREEK.—We have had grand rains within the past few weeks—over 3in. for this month to the 24th. The majority of farmers are busy fallowing, and a good area is being prepared for next year's crop. Feed is abundant and stock are doing well, crops making great progress, and the harvest prospects very promising.

SADDLEWORTH.—Fallowing is being pushed on, the wet weather last month having delayed ploughing. The land has washed badly on some hillsides, particularly down scurifer and seed drill wheelmarks. The crops on land in good heart or where manured look well; stock in good order. Rainfall for August to 23rd, 1.050in.

STANSBURY.—We are having very seasonable weather for the crops, which are looking well. The grubs do not appear to be spreading so much now.

STRATHALBYN.—Splendid rain in July, but dry in August, with severe frosts. Crops looking well, grass fairly good, and stock improving in condition. Rain is wanted.

WOODSIDE.—Fine rains during month, followed by warm days and frosty nights. Crops and grass are making good progress. The benefits of drilling in the seed are very marked.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

August 31st, 1898.

Favorable growing conditions continue throughout the agricultural and pastoral districts. A couple of weeks of quite summery weather caused farmers to become a little anxious; but during the past few days very general refreshing rains have been experienced, and the prospects of the coming crop have consequently improved. Without being optimistic, one must recognise that conditions between this and harvest would have to be very unfavorable to destroy altogether the season's promise. Feed is everywhere abundant, dams and tanks overflowing.

In sympathy with the good outlook, business is better both in town and country.

The breadstuffs market is dull, most of the millers having renewed their stocks when wheat values set back to about 3s. 9d. some weeks ago, so that, although price is now lower, they are not inclined to operate. Holders, realising that the season promises to be an abundant one, are much readier sellers than when the outlook was less certain and quotations higher. Price in this colony, however, is so much above Sydney and Melbourne that an export trade is impossible till our values approximate more closely those of the other colonies. Millers' offal lines are firmer, the exportation of some 300 tons of bran clearing a small surplus that was bearing down values. Forage lines very quiet, the plenteousness of growing feed in every direction accounting for this.

A considerable run down in value of potatoes occurred, a result no doubt of the lessened consumption owing to abnormally high prices ruling, but within the past few days a heavy export order from Melbourne for the Philippine Islands, on account of the American Government, has brought about a recovery; quotations, however, are not likely to rule so high for the remainder of the season as they did a couple of months ago. Onions are scarce, and have steadily risen in price.

In dairy produce lines the leading feature during August has been the very marked increase in supply of butter. Local demand, however, has expanded very considerably, and the Barrier silver fields have been operating freely on this market, so that good clearance has been effected. Values have eased down, and at the moment are sufficiently low to permit of exportation to Europe, which will doubtless be resumed within the coming month. Local demand and export trade kept cleared supplies of eggs, so that value was very well maintained until about ten days ago, when, in sympathy with intercolonial markets, price dropped about 2d., and this line also may be reckoned as having nearly touched bottom. Local cheese factories are busily at work and sending forward increasing quantities, but in rather immature condition, so that with the setting in of warmer weather we shall doubtless have to revert to more mature samples, obtainable only by importation. Bacon, as we anticipated, has improved in value owing to the scarcity of the live material. Honey is dull. Almonds, although unaltered in price, are more saleable. Beeswax finds ready buyers.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, dull at 3s. 6d. to 3s. 7d. per bushel of 60lbs.

Flour.—City brands, £10 to £10 10s.; country, quoted £9 5s. to £10 per ton of 2,000lbs.

Bran.—8d; pollard, 9d. per bushel of 20lbs.

Oats.—Local Algerian, 2s.; stout white, to 2s. 9d. to 2s. 10d.; imported, nominal, 3s. 6d. to 3s. 8d. per bushel of 40lbs.

Barley.—Malting, 4s. 9d. to 5s. 3d., feeding sorts, 2s. to 2s. 4d. per bushel of 50lbs.

Malt.—Local, 9s. to 9s. 6d. per bushel of 40lbs.

Chaff.—£2 12s. 6d. to £2 17s. 6d. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.

Potatoes.—Mount Gambiers, £7 to £7 10s.; Tasmanians, £9 per 2,240lbs.

Onions.—£20 per 2,240lbs.

Butter.—Creamery and factory prints, 8½d. to 9½d.; dairy and collectors' lines, 6½d. to 7½d. per pound.

Cheese.—S.A. Factory, large to loaf, 9d. to 10d. per pound.

Bacon.—Factory-cured sides, 8½d. to 9d.; farm lots, 7½d. to 8d. per pound.

Hams.—S.A. factory, 8d. to 10d. per pound.

Eggs.—Loose, 7½d.; in casks, f.o.b., 9d. per dozen.

Lard.—In bladders, 6d.; tins, 5d. per pound.

Honey.—2½d. to 2¾d. for best extracted, in 60lb. tins; beeswax, 1s. 1d. per pound.

Almonds.—Soft shells, 3½d.; kernels, 8½d. to 9d. per pound.

Gum.—Best clear wattle, 2½d. per pound.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, AUGUST 17.

Present—Mr. F. E. H. W. Krichauff (Chairman), Sir S. Davenport, Hon. A. W. Sandford, M.L.C., Messrs. S. Goode, M. Holtze, H. Kelly, J. Miller, M.P., T. B. Robson, and A. Molineux (Secretary).

Manuring Potatoes.

Mr. ROBSON called attention to article in August issue of *Journal of Agriculture* on fertilisers for potatoes, in which the mixing of nitrate of soda and superphosphate was recommended, whereas Professor Lowrie, in the same issue, stated these fertilisers should not be mixed. Muriate of potash was also recommended, though it was well known that it caused "waxiness."

The SECRETARY said the mixing of the fertilisers mentioned was not recommended in the article in question; in fact there was no recommendation of any particular fertiliser. The results of the American trials were given, and in the table given it was simply shown what quantities of the various fertilisers on the market would supply the necessary ingredients. The nitrogenous manure would be used as a top dressing or applied separately from the super. In regard to muriate of potash, it was distinctly stated in the article that experiments as to the relative effects of the muriate and sulphate on the quality of the tubers were inconclusive.

Soursops (*Oxalis cernua*).

Mr. ROBSON said he noticed the Secretary had stated, in reply to an inquiry, that if gaslime were applied amongst vines it would kill them. This was incorrect. He had heavily dressed patches of oxalis in his orchard with gaslime, putting it quite close to the vines and trees without injuring them. It did little good though, for the oxalis soon grew again as thickly as ever.

The SECRETARY said, notwithstanding Mr. Robson's experience, he certainly would not advise anyone to apply any quantity of gaslime near his vines. It was well known to be highly dangerous to vegetation, and if sufficient were applied to get rid of the oxalis the vines would suffer.

Mr. MILLER referred to the spread of this weed in farming districts, and moved that the Branches be asked to report as to its prevalence in the different districts, and as to means by which it was introduced. He knew that in his own garden it had come in the soil round the roots of a lemon tree, and believed it was largely spread with fruit trees and plants obtained from nurseries where the weed was growing.

Mr. SANDFORD said he had noticed it very thick in some gardens, whereas the grazing land adjoining was quite free. He thought it might be that the stock kept it down, but it was pointed out that it naturally got a hold more readily in cultivated ground, and that stock would only eat small quantities.

Mr. HOLTZE said he found, after considerable experience, that the only way to get rid of the weed was to keep cutting it just below the surface, and so smother it by preventing the leaves from maturing. If the work was not kept up, the weeds would soon get ahead again. In regard to its distribution in soil from nurseries, growers should remove the earth from the roots of the trees and wash them, giving the tree a thorough soaking when planted. It would be far better for the tree, and the soil could be put in a corner where the growth of any weed could be readily noticed.

It was stated by some members that putting pigs on to root up the plants only had a temporary effect, as they failed to get out all the bulbs.

Mr. Miller's motion, that the Branches be asked to report on the matter, was carried.

Tagosaste.

Mr. HOLTZE said he had for years been trying to get a quantity of seed of the true tagosaste (*Cytisus palmensis*) from the Canary Islands, and was pleased to say he had just received some. This plant was of a finer nature and much more valuable than the tree-lucern (*Cytisus proliferus*).

The SECRETARY said he would have the seed sent out at once to a few selected districts for trial.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

232. *Does Bonemeal act as a good Phosphoric Acid Manure?* is a question which by Professor Dr. Julius Kühn and Professor Heinrich is answered with "Yes." They say that it had a considerable effect with rye in a sandy soil, and with pea-flowering plants. Kühn further says that in using 100lbs. of bonemeal phosphoric acid he had the same quantity of grain, and a somewhat higher total produce than he received from manuring with 200lbs. of superphosphatic phosphoric acid. After this, he says further, the possibility of an excellent efficaciousness from the phosphoric acid in the bonemeal cannot be doubted any more, and it is of equal value to the phosphoric acid in Thomas phosphate; but on richer, heavier soils no such results can be expected. Superphosphate may there be preferable, and in cold sandy loam perhaps alone be considered. For summer cereals and other plants with a short life superphosphate should also be used on the best middling strong soil. On better sandy soils it is most economical to consider the price of both Thomas phosphate and bonemeal, calculating also upon the nitrogen in the latter, which runs from 2.9 per cent. to 3.70 per cent., before deciding which you will use. In consequence of these remarks other trials were made with bonemeal at the instance of Professors Mærcker, Wagner, and Liecht, in Mecklenburg. Four-rowed barley was sown in a mild sandy loamy soil, consisting of 38.4 per cent. fine sand, 33.4 per cent. dust, and 12.2 per cent. of parts which could be separated by washing. Analysis showed 0.085 per cent. of nitrogen, 0.046 per cent. of phosphoric acid, 0.14 per cent. of potash, and 0.18 per cent. of lime in this soil. After 240lbs. of kainit per acre had been given some time before, the land was divided into eleven blocks of 2 rods each. Two of these blocks, numbered 1, received no other manure. Two blocks, numbered 2, received 2lbs. 5ozs. (1,250gr.) bonemeal. Two blocks, numbered 3, received 2lbs. 5ozs. (1,250gr.) Thomas phosphate. Two blocks, numbered 4, received 2lbs. 5ozs. bonemeal and 50lbs. of gypsum. Two blocks, numbered 5, received 2lbs. 5ozs. Thomas phosphate and 50lbs. of gypsum. One block, numbered 6, received only 50lbs. of gypsum. The bonemeal contained 18.66 per cent. phosphoric acid and 4.08 per cent. nitrogen, and the Thomas phosphate 13 per cent. phosphoric acid. To compensate for the nitrogen in the bonemeal, the blocks which had received no bonemeal were treated with 11lbs. 9ozs. (6,250gr.) of nitrate of soda, while all the others received only 9lbs. 1oz. (5,000gr.). The results were that on the two blocks 2 bonemeal alone gave actually less than the unmanured blocks by 3.75 per cent.; gypsum alone was 2.5 per cent. better; Thomas phosphate with gypsum, 24.25 per cent.; bonemeal with gypsum, 27 per cent.; and Thomas phosphate alone, 26.75 per cent. better. Gypsum was therefore quite ineffectual with Thomas phosphate, but opened up the phosphoric acid in the bonemeal, and made it more than equal to Thomas phosphate. Where, therefore, dissolving salts are in any soil the action of bonemeal can be very good, without them bad, and this seems the solution of the dissimilar results with bonemeal.

233. *Manuring Orange and other Trees.*—Opinions are by no means unanimous. Under any circumstances a good rich compost should be useful. Most growers of oranges and lemons think that they want vegetable compost more than any other trees; but the application of stable manure, unless it be well-rotted cowdung or the cooling manure from the pigsty, is condemned. Guano, boiling down refuse, and even bonedust are likewise condemned by orange-growers of note in New South Wales, who prefer mulching with forest leaves, or to use virgin soil or compost. In fact, Mr. R. E. McIntosh, who had twenty years' experience at the time, said some years ago that if the use of bonedust and guano be persisted in, it would ruin half the orange trees in the colony. When the trees should be yielding most they will die after being so stimulated. With oranges, Dr. Wooldridge, in Southern California, had the best results by using a complete manure consisting of 20lbs. of nitrogen, 50lbs. of phosphoric acid, and 75lbs. of potash, inasmuch as the leaves looked of a deeper color, the skin of the fruit was $22\frac{1}{2}$ per cent. less in thickness, and the sugar in the juice 37.6 per cent. higher than than where no manure had been given. Stable dung produced only fruit of poor quality, and the fruit manured with nitrogen alone was thick. The manuring of lemon trees in Florida was very successful with a manure containing 4 to 5 per cent. nitrogen, 4 to 5 per cent. phosphoric acid, and 12 to 13 per cent. of potash, which was applied in three portions in February, June, and November. To trees eight years old he applied 8lbs. sulphate of

ammonia, 16lbs. of Thomas phosphate, and 9lbs. of muriate of potash. For oranges a little more Thomas phosphate and less nitrogen was used, but the same quantity of potash. [Here I should remark that ammonia and Thomas phosphate should not be used at the same time; the former need only to be raked in, while the latter requires to be ploughed in or worked in some inches deep. I do not think, however, that quite as much manuring is required in South Australia, except for very poor soils, as has been used in Florida. Last winter I applied to my orange trees 4lbs. of kainit, 3lbs. of Thomas phosphate, and 1½lbs. of nitrate of soda, and to a large lemon tree 1lb. of kainit, 3lbs. of Thomas phosphate, and 1½lbs. of nitrate of soda. All of them are very healthy, and look much better than three others that received only half the quantity.] The effect produced by the different fertilisers is as follows:—Potash causes sound and strong growth of wood, leaves, fruit, or seeds, and is said to give to the fruit a rich aroma and color. The soil may contain much potash in an insoluble state for plant food; but, as you must not dig deeply near the fruit trees, the air cannot act as it otherwise might do in making this supply of potash soluble. You must therefore add potash, and this can be done in small gardens by means of fresh wood ashes, which contain from 6 per cent. to 10 per cent. of potash, but for orchards the potash salts should be used. For heavy soils, however, a warning has been given by Professor Barth against the use of kainit and other raw salts, especially for peach and apricot trees, which may actually die. But I have found a weak solution of kainit (1lb. in 1gall. of water) did no harm to peach trees, and think it mitigated the effect of peach aphid and curl leaf. Still, it may be better to use about 9lbs. of sulphate of potash or muriate of potash to 100 square metres. Potash is stated to be an effectual remedy against the "American blight" or apple aphid, if sprinkled around the trees so far as the roots extend. Crude sulphur has also been mentioned in the same connection. Phosphoric acid increases fruitfulness, and about 5lbs. of bone dust, or 6lbs. of superphosphate, or 8lbs. of Thomas phosphate will supply enough for a 100 square metres of soil—say 500 grammes per 100 square metres. Nitrogen increases the size of the fruit, and for 100 square metres about 3½lbs. may be found in 16½lbs. of sulphate of ammonia or 22lbs. of nitrate of soda for very poor soil; but in South Australia probably half that quantity is sufficient in most cases, and too large a quantity of nitrogen might damage the trees. But the nitrogen can also be supplied in a cheaper way, which is safe, and will not rob the trees if potash and phosphoric acid are also given in sufficient quantity. In Italy and Greece, amongst orange and olive trees and grape vines, vetches or broad beans are sown, and after the green beans have been picked the stalks are ploughed under as green manure. In Hessen Vicia villosa and rye are ploughed under as nitrogenous manure for fruit trees. In Westphalia the blue perennial lupin has been planted around fruit trees by Baron v. d. Borch, and the mere growth of them around them has seemingly supplied them with the necessary nitrogen for the poor calcareous soil upon which the trees were planted. Before the planting of the lupins the trees showed only yellowish leaves, and plum trees had many dry tops of branches and no fruit. Afterwards, even these plum trees recovered and made young healthy wood with dark green leaves. Lime, although no manure, is very necessary for most fruit trees. Apples and quinces require twice as much as pear trees. Plum, apricot, and peach trees, on receiving lime, produce not only finer fruit with more sugar, but they will not throw off so many young fruits at the time of the formation of the woody envelopment of the kernels. Cherries and walnuts can only be relied on to reach a good age and remain healthy, with no gumming of the former, if they find either loose limestone gravel in the subsoil or are limed.

Branch at Caltowie.

The formation of a Branch of the Bureau at Caltowie was approved, with the following gentlemen as members:—Messrs. Lehmann, S. Amey, R. Walsh, P. O'Loughlin, A. McDonald, L. Graham, J. Neale, D. Wilson, G. Petatz, J. Potter, and J. Noonan.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Kadina, Messrs. R. C. Andrews, James Ward, and S. Roberts; Pyap, Mr. J. Bowes; Port Pirie, Mr. A. Wilson; Petersburg, Messrs. J. M. Cadzow and S. Bottrill; Lyndoch, Mr. W. McIntyre; Arthurton, Mr. J. W. Parker; Holder, Mr. W. Watt; Albert, Messrs. W. Clark and F. J. Stephens; Strathalbyn, Messrs. G. Gooch and A. Tucker; Lipson, Messrs. James Brown and Charles Provis; Burra, Mr. R. M. Harvey.

Reports by Branches.

The Secretary reported receipt, since previous meeting, of sixty-three reports of Branch meetings

REPORTS BY BRANCHES.**Arthurton, July 28.**

Present—Messrs. W. Short (Chairman), W. H. Hawke, W. Smith, J. Pearson, M. Baldock, J. Koch, H. Baldock, J. B. Rowe (Hon. Sec.), and two visitors.

VISIT TO HOMESTEAD.—This meeting was held at Mr. Pearson's residence, the outbuildings and garden being inspected. The former were of a substantial nature, of stone with iron roofs, and provision is made for conservation of water from roofs. The garden was in good order; vegetables were looking very well, and promise to repay Mr. Pearson for his labor.

SPLIT HOOF.—Mr. Koch reported that some time ago one of his horses, when galloping in the paddock, trod on something that caused the hoof to split at the back up to the quick. This apparently grew together again, and the horse has been worked since, but the foot has broken out above the hoof, and discharges freely. He had been poulticing it, but was now applying powdered bluestone to cut away the proud flesh. Mr. Baldock said he found a mixture of two parts flour to one of powdered bluestone the best remedy for anything of this sort. Members said it was most important that all foreign substance should be at once removed from any injury.

Robertstown, July 27.

Present—Messrs. N. Westphalen (Chairman), A. Day, H. Rohde, J. E. Milde, F. Fielder, T. Hagley, J. Armstrong, and S. Carter (Hon. Sec.)

TREE-PLANTING.—The Hon. Secretary initiated a discussion on this subject. He advocated planting eucalyptus round all the boundary fences, so that in time, when the present fences decayed, they would have live posts in their place. Plenty of tamarisk cuttings should be planted, as in time of drought they supply good quantities of fodder. The carob tree should also receive a good trial in this district, as it was a most valuable tree. They should make a practice of planting trees about the homestead, as not only did they beautify the place, but also tempered the winds in summer and winter, and afforded shelter for stock. The olive and fig will both grow here, and, as they are both useful and ornamental, they should be given a trial. The best live fence to grow was the African boxthorn, which does well here. Mr. Day said he had a tree of tamarisk which was continually eaten by his cattle, which seemed very fond of it.

Petersburg, July 30.

Present—Messrs. R. Cochrane, (in the chair), W. Heithersay, D. O'Leary, J. Wilson (Hon. Sec.) and three visitors.

PESTS.—Mr. Sowerby tabled insects which were destroying his vegetables. They were in great numbers, and destroyed the leaves by sucking the sap.

Other business of local importance only was transacted.

Dawson, July 30.

Present—Messrs. R. Renton (Chairman), S. Chapman, C. W. Dowden, A. J. Hooper, C. H. Meyers, A. F. Dempsey (Hon. Sec.), and two visitors.

SEED DRILL.—Mr. Stoneman reported that 255 acres had been drilled in with the Superior seed drill under his supervision, making a total of 520 acres put in with the drill under the control of the Branch. The crops drilled in

since the June rains are coming up well, but those put in early are very disappointing. Where the seed was put in deep it malted, but that sown close to the surface remained quite sound. Considerable discussion ensued on the question of the advantages of drilling in crops in this district with its uncertain rainfall and on the construction of the drill, in which the members are of opinion that there is room for a number of minor improvements. It was finally decided to purchase the drill for the Branch.

BINDER TWINE IN CHAFF.—Delegates were appointed to attend the annual Congress in Adelaide, and were instructed to urge the desirableness of adopting some means of prohibiting the practice of cutting binder twine with the chaff.

PRUNING.—Mr. Meyers stated that from report of a previous meeting it would appear that he advocated pruning fruit trees generally as soon as the fruit was off. This, however, was a mistake, as his remarks were only intended to refer to apricot trees.

Morgan, July 30.

Present—Messrs. J. Jackman (Chairman), C. F. W. Pfitzner, A. Stubing, R. Windebank, J. Bruhn, G. Roediger, and J. Wishart (Hon. Sec.).

CONGRESS.—The Hon. Secretary was appointed to attend Congress, and to support proposal for fixing a standard weight for the bag of chaff, and to advocate measures to prevent the adulteration of fertilisers.

BRANCH SHOW.—It was decided to inform the Bowhill Branch that owing to past drought and lateness of the rain during the present season the members of this Branch cannot hope to have any exhibits for the proposed show in September.

Woodside, August 1.

Present—Messrs. J. Hutchens (in chair), J. Cuthbertson, A. Pfeiffer, J. H. Snell, R. W. Kleinschmidt, A. Lorimer, and G. F. Lauterbach (Hon. Sec.).

IMPROVEMENT OF DAIRY COWS.—Members were of opinion that if the Government were purchasing any more pure-bred bulls some Holsteins should be purchased, with a view to crossing them with the progeny of the Jersey bulls obtained last year.

Lyndoch, June 29.

Present—Messrs. H. Kennedy (Chairman), J. M. Sim, W. Rushall, jun., S. Sage, G. H. Hill, R. Ross, and J. Mitchell (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary reported that during the past year only five meetings were held, the average attendance being six out of a membership of ten. Five additional members had been appointed, and he hoped the meetings would be held more regularly in the future and be better attended. Messrs. H. Kennedy and J. Mitchell were re-elected Chairman and Hon. Secretary. A vote of thanks was accorded to Mr. D. Nicholas for providing room for meetings.

TOBACCO FOR SPRAYING PURPOSES.—Mr. Ross wished to know whether any cheap tobacco was obtainable for spraying purposes. [Yes; the Government Storekeeper, Port Adelaide, has waste tobacco for sale at 3d. per pound; 1lb. of this waste and 1lb. of soft soap will make 5galls. of strong wash, fatal to all aphides.—GEN. SEC.]

VINE-PRUNING.—Mr. Sage offered to show any members who care to visit him how he pruned his vines. Generally vines should be pruned as follows :—Shiraz, leave as many rods as possible; Carbenet and Malbec, prune with long rods and trellis where practicable; Muscatel and Mataro, short prune; Grenache, prune well back. Deep and thorough cultivation is necessary if a success is to be made of vine-growing.

Norton's Summit, July 16.

Present—Messrs. J. Jennings (Chairman), J. Bishop, J. Cowling, Thomas Playford, C. W. Giles, J. Hank, J. Pellew, and W. H. Osborne (Hon. Sec.)

CODLIN MOTH.—The Chairman read a paper giving his experience in the treatment of codlin moth last season. He tried spraying, moth traps, bandages, etc. The traps were a complete failure, and more fruit was damaged in the trees in which these were hung than in any others. He caught over 6,000 caterpillars in the bandages, and picked off over 13,000 infested fruits. He referred to the fact that Mr. Quinn, in his report on codlin moth experiments at Marion, called the Williams' Bon Chretien pear the Bartlett, and thought it a mistake on his part to do this, as it was well known that the former was the correct name. A report from Nebraska, U.S.A., dealing with the codlin moth, was read, and members considered the results given differed from usual reports of the results of treatment for codlin moth in America.

Mount Remarkable, July 28.

Present—Messrs. H. B. Ewens (Chairman), A. Mitchell, W. Girdham, G. Yate, W. Lange, C. E. Jorgensen, T. P. Yates, H. Humphris, T. White, C. E. Blieschke, and T. H. Casley (Hon. Sec.)

SORE SHOULDERS.—Mr. Jorgensen read a paper on prevention of and remedy for sore shoulders. It was a great mistake on the part of the farmer to allow the horses' shoulders to become sore, as they were easily prevented. A horse fresh from a spell will sweat very much for the first few days' work. In such cases every evening bathe the shoulders with lukewarm soapy water. It is also a good plan to bathe the shoulders with solution made by steeping chopped wattle bark in water. After a few days the horses can be worked without any risk of soreness, provided the collars are clean and well padded. In the latter part of the season, when the horses are not in such good condition, and the collars get hard, put on a false collar or a wheat bag. If any signs of soreness appear, take out a little of the stuffing from the part of the collar in contact with the sore.

Holder, July 30.

Present—Messrs. F. Slater (Chairman), H. Blizzard, J. Rossiter, J. Mitty, J. Maddocks, J. E. Trimming, E. Crocker, C. Anderson, G. Bennett, P. J. Brougham, J. J. Odgers (Hon. Sec.), and six visitors.

PEAS.—Mr. Blizzard read extract from *May Journal* on the "Cultivation of the Pea," and a discussion followed. Yorkshire Hero was considered the best variety for this district. Members reported that the pea crops in this district have been destroyed by frost.

WEED.—Mr. Bennett called attention to weed growing near his place. Mr. McIntosh said it was a species of *Solanum*, and he believed poisonous.

Baroota Whim, August 3.

Present—Messrs. F. H. Flugge (Chairman), T. J. Simper, W. Bridson, A. Raneberg, and C. W. Hoskin (Hon. Sec.).

WEATHER AND CROPS.—Crops and feed are looking healthy, but backward. Stock poor in condition, but healthy. Rainfall for year to July 31, 5½ in.

BUSINESS.—Mostly formal business transacted. A discussion upon seed drills and binders took place, and members favored the use of both.

Swan Reach, July 28.

Present—Messrs. J. O. J. Kohnke (in the chair), L. Fidge, F. Fischer, F. F. Brecht, E. Micke, B. Schwarz, P. A. Beck (Hon. Sec.), and two visitors.

FLINTY WHEATS.—A discussion took place in reference to note in *Journal of Agriculture and Industry* for July of relative prices of soft and flinty wheats in the London market, and it was decided to endeavor to obtain two bags of seed of each of the following wheats—Red Fife, Blount's Lambigg, Duluth, and Manitoba—for members of the Branch in time for trial next season.

ATTENDANCE.—Attention was drawn to non-attendance of certain members, and it was resolved to enforce the rule that members absent from three consecutive meetings without reasonable excuse be struck off the roll.

Mundoora, July 29.

Present—Messrs. J. Blake (Chairman), G. Haines, J. J. Vanstone, N. J. Francis, W. J. Shearer, and A. E. Gardiner (Hon. Sec.).

BRANCH SHOW.—Mr. Watt reported that the combined Branch show at Port Broughton had been postponed until September 21.

BARLEY.—The Hon. Secretary wished to know whether barley removed from the soil the same constituents as wheat. Mr. Vanstone said he found that, with wheat and barley alongside one another, the former made much better growth under same conditions. He found it necessary to give a liberal dressing of farmyard manure to secure a good crop of barley. The Chairman said his experience with oats and barley was much the same. He found they also require more moisture than wheat to give a good return. Mr. Watt found barley grew quicker at the start than wheat, and he had seen good crops on sandy land considered too light for wheat. In his opinion, barley required more rain than wheat. The Hon. Secretary said he made the inquiry as to what barley took out of the land because he had often heard it said that barley put the land in good heart for the wheat crop. Members would like to hear something definite on this point. [Barley is of little use as a change crop, as it takes practically the same amount of nitrogen and phosphoric acid and more potash than wheat does out of the soil in an equal weight of crop. A wheat crop is sometimes better on land that has been under barley because the latter when grown is manured with stable manure, and the wheat gets the benefit of the unexhausted fertiliser put into the soil.—GEN. SEC.] The Chairman recommended peas as a change crop to benefit the land for wheat, but they could not be grown to any extent here. He had a fine crop of Yorkshire peas a few years ago by broadcasting the seed with a little phosphate and scarifying it in. Mr. G. Haines said he had grown a few good crops of field peas, but preferred corn for fattening pigs.

DRIFTING SAND.—Members reported that, owing to the very rough winds of the last few years, many of the sand hills are beginning to drift. Mr. McDonald wrote that he had been to considerable trouble endeavoring to get grass to grow to prevent the sand from drifting, but without success. Members wished to know whether the General Secretary could recommend any remedy. [Yes; marram grass will stop almost any drift if properly looked after. Roots can be obtained from Mr. G. H. McMillan, Normanville, at about £2 per ton, but it is too late to plant this year with any fair prospect of success. Johnson grass might be tried now, also Evening Primrose, and native bushes and trees that grow naturally on such country.—GEN. SEC.]

Renmark, July 29.

Present—Captain Moffatt (in chair), Messrs. W. H. Harrison, M. Chapman, H. G. Swiney, H. Fetch, S. R. Cox, E. Taylor, R. Kelly, and W. H. Waters (Hon. Sec.).

HON. SECRETARY.—Mr. E. Taylor was elected Hon. Secretary *vice* Mr. Waters, who tendered his resignation.

VINE PRUNING.—Mr Harrison read a paper on "Vine Pruning," which was well discussed

Lyrup, August 2.

Present—Messrs. A. Thornett (Chairman), A. Weaver, A. Pomeroy, F. E. Chick, W. Healy, W. H. Walling, P. Brown, E. Layton, W. R. Skelton, T. Nolan, D. J. Bennett, D. Thayne, W. H. Wilson (Hon. Sec.), and five visitors.

MAIZE.—A visitor tabled splendid samples of Ninety-days maize. Mr. Skelton stated that in America this variety was considered the best for horse-feed, while Horse-tooth and White and Red Hogan were most favored for ensilage.

INSECT PESTS.—A visitor reported having seen some red spiders on his fruit trees, and asked if they would hurt the trees. Mr. Skelton said he had noticed the spiders referred to, and believed they were insect eaters. [The insect commonly known as "red spider" is very small and very destructive to vegetation, but is more nearly allied to the ticks than to the spiders.—GEN. SEC.]

Nantawarra, August 1.

Present—Messrs. E. J. Herbert (Chairman), J. W. Dall, R. Uphill, A. F. Herbert, S. Sleep, A. L. Greenshields, James Nicholls, T. Dixon (Hon. Sec.), and two visitors.

ASHES WITH SUPER.—Mr. Dall asked whether mixing ashes with super. to make it run freely through the drill would have any effect on the super. [Yes; it renders the phosphoric acid less soluble.—GEN. SEC.]

MANURING.—Mr. Sleep initiated a discussion on the effect of manure on the land. He contended that by taking off larger crops as a result of manuring they would impoverish the soil much quicker than if manure is not used, as the commercial fertilisers generally used contain only one constituent of plant life, consequently the other constituents would soon become exhausted. Members generally thought manuring with phosphates would have this effect, but considered it could be prevented by supplying the other requirements of the crop by using different manures. It would be necessary for them to find out by experiment how to do this at least expense. They also thought that if

they could get a 20bush. crop with manure in one year and only 5 or 6 without, it would pay better to manure even if they had to leave the land in grass for three years, as not only would they get the same quantity of wheat at less expense, but the grass would be benefited by the manure. Mr. Dall asked whether any member had tried distributing the manure about March, and working it in with the fallow. None of the members had tried this.

FENCING.—Mr. Nicholls stated that since the discussion on the best time to cut mallee posts for fencing he had been pulling up an old fence, and found the white mallee, especially that cut when the sap was down, lasted much better than other varieties.

Mount Bryan East, July 30.

Present—Messrs. T. Best (Chairman), E. T. Prior, J. Honan, A. Pohlner, J. Prior, R. Webber, T. Wilks, H. Wilkins, W. H. Quinn (Hon. Sec.) and one visitor.

DAIRYING.—Members decided to ask that one of the Jersey bulls purchased by the Government be stationed in this district. It was also decided to ask the Dairy Instructor at what temperature milk should be kept to allow the cream to rise properly. [Place in cans at temperature it comes from cow, and set the cans where the milk will cool, and so allow the cream to rise. The quicker the milk is cooled the better, that is by placing the can in cool room, or in another can containing water.—GEN. SEC.].

GREEN FEED.—The Hon. Secretary tabled splendid sample of green feed, 18in. high, grown by Mr. Collins, at Collinsville, on an irrigated plot of land.

PLOUGHING.—Mr. E. T. Prior asked the best way to mark out lands to kill weeds. Mr. Wilkins considered it best to open out crown furrows. Other members advised to head shallow crown. The Hon. Secretary advised ploughing round the paddocks where the land is suitable.

Golden Grove, August 1.

Present—Messrs. T. G. McPharlin (Chairman), H. Bowey, Jno. McEwin, D. Smyth, R. Coleman, A. Roberts, J. Ross, J. Murphy, W. J. Rehn, H. P. Day, and A. Harper (Hon. Sec.).

DAIRYING.—The Chairman read a paper on this subject, and promised to continue it at next meeting. He also read article showing the low average yield per cow in Australia as compared with other countries. Considerable discussion ensued on matters connected with the dairying industry, and reference was made to the value of the common artichoke (*Cynara scolymus*) for fodder purposes, those who have used it for ensilage reporting favorably on their experiment. Mr. Ross referred to the increased butter yield by feeding the skim milk to the cows. Mr. Bowey found sheep on the farm more profitable than cows, while Mr. Day doubted whether they would make dairying and farming combined pay.

Albert, August 6.

Present.—Messrs. J. Wetherall (Chairman), G. Holmes, P. Johnson, T. Cooper, G. Munn, H. Lane, G. Acres, J. Gill, J. Brewin, W. Napper, and H. L. Smith (Hon Sec.).

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year eleven meetings were held, with an average attendance of eight members. A number of interesting discussions had taken place, and numerous

experiments with seeds, manures, &c., conducted and reported on. Messrs. J. Brewin, J. Gill, and H. L. Smith were elected Chairman, Vice-Chairman, and Hon. Secretary respectively.

WEEDS.—Mr. Wetherall called attention to the spread of Bathurst bur in the district, and urged members to do their utmost to eradicate it. Mr. Munn stated that "sheepweed" was also spreading in the district.

BRANCH SHOW.—It was decided to take part in the combined Branch Show, at Chukka Bend, on September 29.

Kapunda, August 6.

Present—Messrs. G. Teagle (Chairman), H. King, J. P. Orchard, J. A. Schultz, J. H. Pascoe, Patrick Kerin, W. Flavel, J. J. O'Sullivan, and T. Jeffs (Hon. Sec.).

CODLIN MOTH.—It was decided to nominate a local resident as inspector of fruit, so as to prevent the introduction of infested fruit into the district.

SPARROWS.—The nuisance caused by these birds was again discussed, and members were of opinion that united action on the part of the local governing bodies was necessary. It was stated that if poisoned wheat is soaked in grease the birds take it more readily.

Dowlingville, July 29.

Present—Messrs. R. A. Montgomery (Chairman), R. Foggo, G. Mason, J. Phelps, H. Crowell, S. Tee, T. Illman, F. Roberts, T. Kenny, J. L. Broadbent (Hon. Sec.), and one visitor.

AGRICULTURAL MACHINERY.—Mr. Illman read a paper on this subject, to the following effect:—

The grass mower was first introduced some forty years or more ago, but was soon thrown aside, and it was some years before a more workable machine was introduced. Since then, however, steady progress has been made, and to-day we have in the binder an almost perfect machine. The threshing machine was of earlier origin than the mower, and probably some of our farmers still remember the cumbersome machines first introduced. These were too expensive for any but the moneyed men, who used to travel it round threshing for other farmers. Later on came the stripper, the invention of which was due to South Australian ingenuity. This was very clumsy and somewhat ineffective, but improvements were soon made, until they have a machine by means of which they have been able to harvest their crops so as to compete in the world's markets. For the past thirty years very little real improvement has been made in the stripper, and in his opinion the necessary improvements have been rather neglected. One thing requiring alteration is the size of the wheels. They are too low. As most of the land they have to travel over is soft, the wheels should be as high as possible. Then the off wheel is too heavy, adding to the draught. The outside capacity of the box is, say, four bags of wheat, so that the wheel could be considerably lightened without lessening the strength. Then the beater and comb are in need of attention. As this is the long end of the lever, an improvement might be made by which the draught would be lightened, and the threshing qualities improved. There is altogether too much waste in the front of our machines. The general width of the machine is 4ft. 6in., this could be extended to 5ft. 3in. or 5ft. 6in. without materially increasing the draught, and the extra 9 in. or 12 in. each round would make a very considerable difference in the day's work. Such a machine could be easily drawn by three horses, and in windy districts would be of great value, as the quicker the crop can be harvested the less loss from storm. In regard to shows, the implements should be judged from the working capabilities, and not from the polish and finish specially given to show machines.

LOCATION OF BRANCHES.—Mr. Phelps thought the *Journal of Agriculture and Industry* would be greatly improved if, with the index, a list was given showing location and distance from Adelaide of the Branches of the Bureau, the rainfall, &c. If this were done they would have some idea in reading the reports whether the experiences of the members of other Branches would be

of value in their own district. As far as he was concerned, he must admit that he really did not know in what locality certain Branches were situated. Considerable discussion ensued, and it was decided to suggest that a map should be issued, giving the particulars referred to by Mr. Phelps, the members being of opinion that if this were done it would add considerably to the value of the *Journal* and to the Bureau reports.

Gumeracha, July 25.

Present—Messrs. W. A. Lee (Chairman), R. P. Scott, W. V. Bond, D. Hanna, J. Monfries, W. J. Hannaford, S. Hannaford, W. Jamieson, W. Cornish, W. Green, G. F. Nepean-Smith, Dr. Stephens, and Dr. Nicholls (Hon. Sec.).

TREE SCRAPER.—Mr. Smith stated that for scraping the rough bark off the stems and limbs of fruit trees the Californian growers favored a three-sided knife, one side with large curve, one with small curve, and one side flat, the handle being in the centre. A steel currycomb was also very handy for this work.

PRUNING OF FRUIT TREES.—A paper upon this subject was read, in which it was recommended to wait until the trees are quite denuded of leaves, or dormant, before commencing. In this locality June and July are the months during which stone fruit trees should be pruned, and perhaps a little earlier for apples and pears if the winter is early and severe. Trees should be kept down with due regard to proportionate head and trunk. Nearly every tree should be headed down when first planted, the object being to form the tree as near the roots as possible. Peaches and apricots should be severely pruned. Plums and cherries require next to no pruning when once they have been "formed." Some apples, such as Cleopatra, require very little pruning, but others, such as Stone Pippin and Dunn's Seedling, with long straight growths have to be ruthlessly cut back to facilitate treatment for scab, codlin moth, &c. Mr. Hannaford said he believed in the goblet-shaped tree. There was no fear of the wood drying back when the centre was exposed if care were taken. Mr. Smith believed it better to take out the heavier wood in peaches, apricots, and cherries in summer, as if done in winter it caused gumming. The American plan was to start three, four, or five main leaders from the sides and let each one double, and never more than this. He believed the Cleopatra apple required even heavier "backing" than Mr. Hannaford suggested, and did not agree with him in regard to pruning cherries, as, after a time, they require pruning and the dead wood removing. Mr. S. Hannaford thought cherries required pruning for two or three years to form the tree, but after that very little was required. No two trees require exactly the same treatment, and a man must know his trees before he can prune satisfactorily; locality makes a difference also.

Gawler River, July 29.

Present—Messrs. A. M. Dawkins (Chairman), J. Hillier, A. Hatcher, G. Johnston, F. Roediger, D. Humphries, A. Bray, H. Heaslip, H. Roberts, H. Roediger (Hon. Sec.), and two visitors.

Pigs.—The Chairman initiated a discussion on the breeding and feeding of pigs. He stated that care should be taken not to inbreed too closely, or their pigs would soon degenerate. Mr. Heaslip preferred the Berkshire for farmers' purposes and the Essex for market. Mr. Hillier and the Hon. Secretary advocated the Berkshire-Poland-China cross for bacon pigs, as they mature

quickly and attain a good size quicker than the pure Berkshire. Mr. Johnston and Mr. Humphries reported satisfactory results from feeding peas to pigs. The Hon. Secretary preferred barley, as, although peas were very good, the barley was more economical being easier to harvest. In reply to questions, two members said they found pigs fattened quicker on crushed corn than on boiled. Members were of opinion that it would not be profitable to feed pigs on good saleable corn only.

BACON-CURING.—In reply to question, the Hon. Secretary said by dry-salting on a flagstone, using the best fine salt and a little saltpetre, he got good quality bacon. If the pigs are fed on good wholesome food and kept in a fairly large and dry sty, there is no necessity to sweeten the bacon with sugar. He gave his pigs principally separator milk and crushed barley soaked in milk for twelve hours. Members agreed that the meat should be allowed to cool and set well before salting.

Forster, August 1.

Present—Messrs. A. Johns (in chair), W. Johns, F. Johns, J. Johns, J. Retallack, A. Retallack, J. R. Bolt, J. Sears, W. H. Bennett (Hon. Sec.), and twelve visitors.

FARMING.—Mr. J. Retallack read a short paper on “Making the Best Use of the Farm.” He advised cropping only new land or fallow. Fallowing should be completed by August, to allow the winter rains to go in. Sow 45lbs. of wheat per acre, and scarify it in on the fallows, or on new mallee land plough it in and harrow. Keep good poultry. The crosses between the Langshan and the Andalusian or Leghorn would prove good layers and fair table birds. Turkeys will pay to raise; the white turkey is hardy, and fetches best price in Adelaide market. They will look after themselves if left to run in the growing crop. Mr. Bennett found the Andalusian fowls first-class layers, and believed them the most profitable. Others agreed.

ROLLING V. MULLENISING.—Considerable discussion on these matters took place. Opinions were about equally divided as to advantages of both methods of getting rid of the scrub. It was claimed that mullenising was better because the job was finished when the scrub has been burnt: that the land gives better crops; that it could be done equally as cheap as rolling; that there was no injury to horses from staking, &c. On the other hand, it was contended that rolling was cheaper, quicker, and just as effective, and that many of the trees were grubbed right out of the ground by the pressure. It was stated that from five up to twelve acres per day could be rolled down, and one member said he had rolled about seven acres a day, at a cost of 8s. - scrub that would have cost 7s. 6d. per acre to cut. Another member doubted whether five horses could roll scrub that would cost even 6s. per acre to mullenise.

Woolundunga, July 15.

Present—Messrs. J. H. Michael (Chairman), F. Sells, G. Lewis, A. S. Gunning, and N. Rogers (Hon. Sec.).

QUESTIONS.—In reply to questions it was stated that no living fruit spurs should be removed from apricot trees; peach trees throw their buds owing to rough weather. Figs can be grown from seeds of some kinds of imported dry figs, but many of those grown in South Australia do not carry fertile seeds. Moor Park apricot is about the best market variety, and Carrington, Donald, and the Moor Park section are amongst the best latest sorts. End of June in a good season, and end of May in ordinary seasons is the latest time

to sow seed for a hay crop. Peach trees and apple trees may be grown intermixed without interference if the soil and circumstances are suitable. June to July is the proper time to prune roses.

APRICOT-GROWING.—Mr. Gunning read an elaborate paper upon the apricot. The following are a few of the leading points:—

The apricot belongs to the plum family, bears in three years, and comes to full bearing in six years, grows well in sandy loam, must be well drained and often cultivated, requires at least 20in. of rainfall, is well suited to this warm latitude, 33° S., requires protection against strong winds. Some of the best shelters are pepper trees, eucargums, and carobs. Tamarix provides a quick-growing low shelter where there is any sand drift. Trees should be raised from apricot stones, then grafted or budded with variety desired. Plant during July and August, pack soil well around the roots, head down to 18in., or even 15in., and water well. On sloping situations stems may be a little higher. Allow three branches 8in. apart. Where strong winds prevail erect hurdles to windward. Perhaps the Early Oullin is best planted on the windward side of the orchard. It is prolific at Renmark. Moor Park, early, is best for flavor, jam, and drying; Royal is the largest. Young trees cost about 55s. per 100. Where planting is to be extended it would be well to start a nursery to provide trees. At 20ft. apart on the square 109 trees per acre will be required, or 125 on septuple principle, which is best and most convenient to work. Some people plant trees 12ft. apart to protect each other against hot and cold winds, but this involves hand cultivation. He deprecated alternate planting with vines, as this made the orchard too exposed. Winter pruning should be completed before August. In pruning fruit spurs cut outside the wood bud. A later pruning is done in December. Prune new wood back to 4in. till the sixth year. [Too severe, except with intense cultivation and plenty irrigation.—GEN. SEC.] For compactness prune to shape of wineglass. Plough three times, and cultivate after each irrigation or rain, never deeper than 3in. To make 1lb dry fruit 5lbs. fresh is required—this should be quite ripe. At Renmark fruit is gathered in 34lb. picking-boxes, between 7 a.m. and 5 p.m., at prices up to 15s. per ton. Some of the trees yield over 2cwts. They leave the unripe fruit for future picking. The refuse from boiling-down works, "hashmaganda," is considered an excellent manure. About 2s. 6d. worth with half ton superphosphate and some ashes, would be a good dressing for an acre of tree. When drying, the fruit is halved, stoned, and spread on trays 3ft. x 2ft with cleats 1½in. x 1in. on ends, placed on lucern patch for about a week, and stacked whenever rain threatens. If sulphured, about 2lbs. sulphur suffices for ninety trays of 1½lbs to 1½lbs. fruit to each; time, thirty minutes. When dried the fruit is sorted into first and second qualities, and is sweated for a time to make the sample even. The best flavored fruit grow almost always on dry stony land. Irrigation apparently makes weak flavor in the fruit.

Boothby, August 1.

Present—Messrs. J. T. Whyte (Chairman), T. Sims, J. A. Foulds, E. Bradley, J. Bell, R. Chaplin, M. Leonard, J. R. Way, H. S. Robinson, T. Robinson, A. Turnbull, R. M. B. Whyte (Hon. Sec.), and three visitors.

POULTRY.—Mr. Leonard read a short paper on this subject. Owing to their geographical position, he thought poultry about the best paying by-product of the farm in this district. The annual export of eggs from South Australia to her neighbors is valued at £50,000, and the poultry industry is scarcely established yet. We should pay more attention to the keeping of poultry, and look to England as our principal customer. The Port Adelaide Dépôt afforded every facility for the export of eggs and poultry. Farmers who keep poultry should have them in an enclosed yard, as otherwise they damage the haystacks and crops near the homestead. Fowlhouses should be erected of galvanized iron, in order to prevent any harbor for insects. In stocking your yards secure good birds. Some prefer the common fowls; and there is no doubt that if properly looked after they lay well, but they are useless for table purposes. In regard to feed, they had a source from which a good supply could be profitably obtained. Every year they had a fair supply of screenings, &c., from the wheat. This is in many cases used as horsefeed, and is poor stuff for that purpose; it could, however, be profitably used for poultry. Then much of their wheat sent to the market is subjected to a reduction, especially in a rusty year. It would pay better to clean it thoroughly and offer none for sale

but what will bring top price, keeping all inferior grain for poultry. Mr. Foulds wanted to know what was a fair ration of wheat for fowls, either running at large or shut up. Mr. Leonard said a bushel of wheat given to seventy fowls should produce 20 doz. eggs. Mr. Turnbull said that with a good haystack and stubble paddock near the homestead the fowls will pick up all the feed they require and do well. He had best results from the White Brahma crossed with Spanish; the cross was a good layer and splendid looking bird for the table. Mr. Robinson said crossbreds were best, but it was necessary to get good pure-bred birds to start with. To get eggs in winter depended upon time of the year the chickens were hatched. When rabbits will fetch 10d. to 1s. in London it would pay them better to catch rabbits than rear poultry.

STANDARD WEIGHT OF CHAFF.—A long discussion took place on this subject, and it was resolved that in the opinion of this meeting 40lbs. should be the standard weight for a bag of chaff.

Colton, August 6.

Present—Messrs. P. P. Kenny (Chairman), A. S. Bartlett, W. J. Packer, A. A. Stephens, J. L. Dennison, W. A. Barnes, W. McElder, M. S. W. Kenny, and R. Hall (Hon. Sec.).

APHIS.—Mr. Stephens wished to know whether there was any connection between the small black flies to be found hovering about manure heaps and the winged aphis on turnips and cabbages. [No.—GEN. SEC.] Mr. Packer said he had tried an infusion of wormwood leaves for this pest. The Hon. Secretary reported satisfactory results from use of infusion of quassia chips. Mr. Bartlett said he noticed last year very few of the small black flies referred to by Mr. Stephens, and they were not much troubled by aphis, this year they were both very plentiful.

MANURES.—Mr. Packer read paper on “Manures.”

Lipson, July 30.

Present—Messrs. G. Provis (in chair), T. Cosh, H. Brougham, and E. J. Barraud (Hon. Sec.).

SPLIT HOOF.—Mr. Brougham wished to know best treatment of horses' hoofs that have split. Members thought burning a bar just above the crack the best remedy.

COPRA CAKE.—Mr. Provis said he had been feeding copra cake to his cows with satisfactory results, his butter returns being considerably enhanced. About 1lb. of this cake per day, with cocky chaff, was sufficient.

SCRUB LAND.—The Hon. Secretary said he found that scrub land that had been cropped for several years and then left out for a year or two gave very poor returns when again cropped owing to the prevalence of takeall or other diseases.

Riverton, July 30.

Present—Messrs. H. A. Davis (Chairman), D. Kirk, F. Chapman, T. Gravestock, A. Hannaford, C. C. Castine, W. J. Andrews, H. A. Hussey (Hon. Sec.), and one visitor.

STANDARD WEIGHT FOR CHAFF.—A discussion took place on this subject, and it was resolved that this Branch is of opinion that the standard weight for chaff should be 2,000lbs. per ton and 50lbs. per bag. It was considered that a great saving in bags would result from adoption of this standard.

CODLIN MOTH.—Mr. Gravestock moved, "That, with a view to stamping out this pest, the Government be asked to make it illegal to remove fruit from any orchard infested with codlin moth." There was, however, no second to the motion, members being of opinion that such action would be too severe on the growers.

BAGSHAW'S SIEVE.—Mr. M. Badman showed one of these sieves for removing wild cabbage and other seeds from wheat. Members tried the machine and considered it of good value, especially for cleaning seed wheat, as besides small seeds, much of the broken grain is removed.

RAINFALL.—For July, 3½ in.; for seven months, 15 in.

Quorn, August 10.

Present—Messrs. J. B. Rowe (Chairman), T. Herde, C. Patten, R. Thompson, and A. F. Noll (Hon. Sec.).

BUNT.—Messrs. Rowe and Patten reported having sown wheat and bunt balls in separate boxes to test whether statement that the bunt balls would grow and produce a plant of themselves was true. In each case there was no sign of growth from the bunt, and members agreed that bunt will not grow without the wheat plant. Mr. Herde said he had had a paddock of wheat sown with pickled seed. One part was badly bunted and the other quite free, although sown with same lot of seed, and under exactly similar conditions. He considered bunt was caused by the weather. [If so, why was only part of the crop affected, seeing it all experienced the same weather? The instance quoted proves conclusively, to those who require any proof on the subject, that bunt is *not* caused by the weather.—GEN. SEC.]

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year nine meetings were held, with an average attendance of five members. Five practical papers have been read and discussed. Mr. R. Thompson was elected Chairman, and Mr. A. F. Noll re-elected Hon. Secretary for ensuing year.

DAIRYING.—It was decided to invite the Dairy Instructor to visit the district and give a lecture on butter-making.

Millicent, August 3.

Present—Messrs. R. Campbell (Chairman), W. Whennen, W. J. Whennen, W. R. Foster, H. Hart, L. Oberlander, G. Mutton, G. Tantram, and E. J. Harris (Hon. Sec.).

BUNT.—Some discussion took place on damage by grubs on new land at Glencoe; also to bad condition, on some thickly-sown crop compared with portion of crop where less seed was sown. Mr. Hart thought difference was due to the action of the pickle, or to two different varieties of wheat being sown. He thought a lot of the pickling was done improperly; he deprecated pouring the solution on the heap, and shoveling it over. The best plan was to have two casks or tubs. Set one on a bench the height of the other cask. Run the wheat into the top cask containing the pickle, skim off the bunt balls, and, when long enough in the solution, drain off into the bottom cask, and turn the grain on to the floor. He thought five minutes in the pickle long enough.

HOMESTEAD MEETING.—Mr. Harris invited members to hold next meeting at his homestead. He noticed that other Branches held homestead meetings, and thought they would derive some good from them. Members concurred, and one said they could always see something to find fault with, if nothing

else. Mr. Foster thought it a good thing to find fault sometimes. He liked good wholesome criticism, and thought Australians were too thin-skinned generally.

POULTRY-BREEDING.—Mr. Foster read a paper on this subject, of which the following is an abstract :—

The average farmer, when advised to improve his poultry, replies that it does not pay to do so. My opinion is that it does not pay to neglect them. Most writers on poultry say that to have hens lay during winter they must roost in a warm, comfortable fowlhouse, but those who have a clump of suitable trees should let the fowls roost in them. They will be healthier and lay better. As to the most suitable breed, this depends on locality. For this district, for laying only, the Minorcas are wonderful layers; also lay large eggs, do not go broody, commence laying at four or five months old, are very hardy, easily reared; they are good foragers, and not so mischievous as some of the active breeds. If crossed with good Langshan hens the progeny are first-class general purpose fowls. When purchasing Minorcas, get them with red faces and white ear lobes; and for size, stamina and good layers, do *not* inbreed. Minorca chicks are black and white in color. For table fowls breed Dorkings. They are perfectly hardy and healthy, and some strains are very good layers. For the very best table fowl the Indian Game and Dorking cross is preferable. Better buy an Indian Game cockerel from some breeder who keeps good ones, and keep him in a yard with four of the largest and heaviest Dorking hens. The Langshan is a first-class fowl either for eggs or table purposes, and very hardy. It is also a good breed to cross with common fowls, gives size and also improves laying qualities. The Wyandotte seems to be a favorite breed just now. Some poultry writers recommend the Indian Game and Wyandotte cross for the English market. If they are correct, the English market has undergone a change since he knew it. Game and Dorking were, and are yet, first favorite in England for table purposes. To breed winter layers have chicks hatched in August, September, and early in October. For feed in winter, bran and pollard in the morning, one part of bran and two of pollard; pour boiling water over the bran, mix with the pollard, cover and leave till it can be handled without scalding; feed as soon as fowls leave their roosts. When available feed boiled potatoes with pollard. When mixing soft food for fowls or chicks do not have it soft or sticky; it should break in pieces when a handful is thrown on the ground. The quantity for full-grown fowls, one small handful half size of a cricket ball for each fowl, morning only. In the afternoon or evening one small handful of wheat to each fowl scattered among litter, or short straw, or clean soil newly dug over. Keep a constant supply of clean fresh water in the shade. This is for fowls with unlimited range. To those in small yards give a small handful of wheat, barley or oats, and plenty of green feed in the middle of the day, also grit occasionally. Feed in a clean place; do not throw food among filth and dirt. A scratching shed should be provided facing east, with raised floor, and spread with dry sand and ashes, to be changed now and then, and should be wind and rain proof. Those who wish to rear pure-bred fowls should not insist on having eggs or birds from prizewinners, but go to some reliable breeder and allow him to choose. Getting eggs from prize stock and inbreeding are the chief reasons so many people have such poor results with pure stock. Go in for quality instead of quantity, and study the tastes of consumers in place of fads and fancies. Then, instead of hunting for buyers, they will come after our produce. As a first step towards improvement in these matters he would advise every farmer to become a subscriber to the *Journal of Agriculture*.

Cherry Gardens, August 9.

Present—Messrs. E. Wright (Chairman), T. Jacobs, J. Lewis, C. Lewis, J. Mackereth, J. Potter, J. Richards, J. Choate, G. Hicks, R. Gibbins, J. Metcalf, W. Nicholls, C. Ricks (Hon. Sec.), and three visitors.

LEMONS.—Mr. Metcalf tabled very good samples of lemons from trees about three years old. The Hon. Secretary said at the last Hills Conference he advocated growing oranges and lemons in sheltered spots in the hills, but doubts were expressed as to whether they would do. They had proof here that lemons would do well.

REDWATER.—Mr. Gibbins said he cured several cows recently with the following :—Dissolve 1oz. Armenian bole, 1oz. dragon's blood, 1 dram alum, and 2ozs. Castile soap in a quart bottle of hot ale, and give when lukewarm; repeat dose in twelve hours.

EDUCATION FOR YOUNG CULTIVATORS.—Mr. R. Gibbins read a paper "Hints for Farmers," of which the following gives the leading ideas:—

In order to be successful a farmer needs to possess some knowledge about plants, soils, animals, &c., as well as of business matters. His education on these lines should commence at an early age, and those who are responsible for that education should try to make the drudgery of the farm as light and interesting as possible. Young people of the present day enjoy advantages which were not available in the earlier days of the colony, and the education upon agronomical matters by several of the State school teachers will probably result beneficially to the youth of the present generation, by making them more or less acquainted with the nature and life history of beneficial as well as the noxious or injurious insects, birds, and plants which affect the interests of the occupiers and utilisers of the soil. This kind of education will at least lead some of the young people into habits of close independent observation of the phenomena and occurrences surrounding them, and possibly tend to a solution of some of the problems which now puzzle scientific men because of the limited opportunity which the majority have for field study. Such study and the knowledge thereby acquired must be of great value in after life. Young people might easily be induced to take an intelligent interest in the insects of the farm by means of small prizes for collections of injurious varieties. Collections of grasses, weeds of arable lands, together with their fruits or seeds might also be competed for at the local shows. It is very desirable that young people of the rural classes should know more about livestock, both in health and disease, than is usual.

SMYNTHURUS PEST.—Members reported these little green hopping insects were very prevalent and destructive, peas, potatoes, and all other soft vegetation being attacked. Members asked if there was any known remedy for this pest. [There is no practicable remedy for them when they attack such plants as these. On lucern they can be kept under by the application of gas-lime.—**GEN. SEC.**]

Burra, August 12.

Present.—Hon. J. Lewis (Chairman), Jos. Flower, F. Duldig, F. A. S. Field, Jas. Scott, Eli Goodridge, W. Heinrich, R. M. Harvey, and A. H. Forder (Hon. Sec.).

OFFICERS.—Mr. Lewis said he wished to resign his position as chairman. He had held the position for a long time, and felt assured a change of blood would be beneficial. Mr. Forder tendered his resignation as Hon. Secretary, as he was leaving the district. A hearty vote of thanks was accorded to the retiring officers, the Hon. Secretary having held his office for ten years. Messrs. F. A. S. Field and R. M. Harvey were elected Chairman and Hon. Secretary respectively.

DAIRYING.—A discussion on this subject took place, and members expressed the opinion that there had been no noticeable improvement in the dairy herds in this district of late years. Mr. Lewis offered members the loan of his Jersey bull, each member to have the use of him for one month. Other matters of local interest were dealt with.

Crystal Brook, July 30.

Present.—Messrs. G. Davidson (Chairman), W. J. Venning, J. C. Symons, R. Pavy, W. Hamlyn, W. Morrish, J. Forgon, E. Pope, J. F. Bryson, G. Miell (Hon. Sec.), and three visitors.

FARMING ON BORROWED CAPITAL.—Mr. Venning read an article from an English journal on this subject, and considerable discussion ensued. Members generally were not favorable to borrowing money for farming purposes.

DAIRYING.—Mr. G. S. Thomson, Dairy Instructor, visited Crystal Brook on August 9, and delivered an instructive address on dairying, which was much appreciated.

Pine Forest, August 1.

Present—Messrs. W. H. Jettner (Chairman), J. St. J. Mudge, E. Masters, F. Inglis, W. Wurfel, A. Mudge, and R. Barr, jun. (Hon. Sec.).

CONGRESS.—Members expressed their satisfaction at the issue of a railway pass to one delegate from each Branch represented at the forthcoming Congress.

POULTRY COMPLAINT.—The Chairman reported virulent disease amongst his poultry. The symptoms were drowsiness and partial blindness, and the heads turn almost black before death. A discussion ensued on rearing fowls, and members were generally of opinion that pure-bred tows were more susceptible to disease than the common barndoor fowl.

ARBOR DAY.—It was decided to hold an arbor day during August.

COLIC IN HORSES.—Mr. Zilm read a short paper on treatment for bots in horses, also colic. He strongly recommended an infusion of red or cayenne pepper, given warm, and followed by an aperient for colic. When the stomach is distended by gas, give first a tablespoonful of carbonate of soda in half a pint of water, or inject per rectum a quantity of warm water. The practice of making an animal so affected run about, or turning him on his back and rubbing his belly with a rail, or in other ways violently working him, is both cruel and unnecessary.

Finniss, August 1.

Present—Messrs. T. Collett (Chairman), S. Eagle, A. Willecock, J. Chibnall, W. W. Heath, H. Langrehr, and S. Collett (Hon. Sec.).

EXHIBITS.—Mr. Langrehr tabled extraordinary specimen of oats. From one grain sown on plot manured with superphosphate a plant grew to 5ft. in height and produced 111 stems. The Chairman showed Long Red beet from Bureau seed. Business of local importance was also transacted.

Onetree Hill, July 29.

Present—Messrs. J. Bowman (Chairman), H. H. Blackham, F. Bowman, G. Bowman, J. S. Harvey, F. L. Hould, A. Thomas, W. Kelly, E. A. Kelly, and J. Lucas (Hon. Sec.).

FODDERS.—Mr. Blackham gave an address on this subject. He referred to the importance of rape and lucern. The former and similar crops prepared the ground for subsequent crops by subduing noxious growths. Jersey tree kale, from which extraordinary returns had been reported, and thousand-headed kale were favored by many; but they had this drawback, as far as dairying was concerned, in that they caused undesirable flavors in the milk. They could, however, be profitably grown for poultry feed. He recommended the cultivation and conservation of our indigenous grasses: these were succulent and rich, and if preserved until other food was exhausted they would be able to produce butter when most profitable prices are obtainable. In the discussion which followed it was stated that stock did not appear to be partial to the native grasses except when young. An inquiry as to whether lucern could be grown in the hills was answered by a member who has grown it successfully on sandy and friable soil, where the roots had to go a good depth for water. Rape did not find favor as a summer fodder, the general opinion being that it should be sown in time to catch the earliest winter rains. It was admitted that farmers generally failed to provide fodder for their cows when butter was dearest. Mr. Thomas suggested a three years' rotation to preserve the native

grasses. Mr. F. Bowman promised to distribute seed of Jersey kale. His patch of this had given an unfailing supply of food for his poultry for two or three years.

FREAK OF NATURE.—Mr. Kelly said he had in his flock of sheep a lamb with a tuft of wool growing on one of its eyeballs. The lamb was blind in his eye, but was otherwise healthy and well formed. A member suggested that Mr. Kelly was carrying things too far when he attempted to grow wool on his sheep's eyes as well as their backs!

Redhill, August 7.

Present—Messrs. F. Wheaton (Chairman), D. Steele, D. Lithgow, G. Wheaton, S. H. Treloar, R. H. Siviour, A. A. Robertson, T. H. Torr, R. T. Nicholls, and T. McDonald (Hon. Sec.).

OFFICERS.—The following officers were elected for the ensuing year:—Chairman, Mr. S. H. Treloar; Vice-chairman, Mr. G. Wheaton; Hon. Secretary, Mr. T. McDonald.

FALLOWING.—Mr. Siviour read a short paper on this subject. He advocated taking two crops off in three years, and fallowing as soon as possible after there has been sufficient rain to start the rubbish. He did not believe in ploughing the same depth each year. If they had been ploughing to a depth of 4in. or 5in. he would advise ploughing 2in. deeper next season, then the following season 1in. less, and the next 1in. more again. By this means fresh soil is continuously being turned up, and when thoroughly pulverised and mixed with the other soil far better results will be obtained than by ploughing the same depth each year. He did not believe in sheep for cleaning the land; in fact, he thought they had the opposite effect, seeds being carried in their wool. He would prefer to work the land thoroughly to get rid of the weeds. Mr. Lithgow generally agreed with Mr. Siviour, except that he did not consider deep ploughing advisable on his land. Mr. Steele would keep the soil well worked and loose, but was not an advocate of deep ploughing. Mr. Wheaton considers sheep are an improvement; that the land should be well grazed the year before fallowing, and that fallowing should be commenced in the summer when possible, as by waiting for the rain you run a good chance of being behind with the work. One crop every third year was quite enough to expect from their land. Mr. Treloar agreed in the main with Mr. Siviour, but on his land in the hills 4in. or 5in. was quite deep enough to plough; in dry seasons deep ploughing would probably give better results. In regard to sheep, care must be exercised in bringing them on to the fallow from well-grassed paddocks or they would carry the seeds in their wool and dirty the land.

Kadina, August 4.

Present—Messrs. T. M. Rendell (Chairman), P. Roach, J. M. Inglis, J. Cowley, G. E. Putland, J. W. Taylor (Hon. Sec.), and D. F. Kennedy, of Pine Forest Branch.

HINTS FOR FARMERS.—The Chairman read a short paper on this subject. He advised that where outside labor was necessary a set of rules should be drawn up, and the attention of those employed drawn to them. Only such rules as were necessary should be made, but these should be adhered to. Every farmer should endeavor to put up good sheds for his stock and implements, and also have separate pegs in the stable for the harness of each horse. If this were done they would know which belonged to each horse, and would get rid

of one cause of sore shoulders. Sometimes the harness was simply thrown in a heap in one corner, and he need scarcely point out that with such treatment it will not last as long as if properly attended to. When any implement has been done with for the season, clean it, repair, and paint where necessary, and put it under cover until again needed. This will save money, time, and worry. Set apart a portion of the outhouses as a workshop, with a few handy tools, carpenter's bench, and portable forge. There were many little jobs that could be done by the farmers themselves for which they often paid other people. The workshop should be kept locked, and it should be a rule that all tools were to be returned to their proper place. Considerable discussion ensued, most of the members taking part.

Paskeville, August 6.

Present—Messrs. H. F. Koch (Chairman), A. C. Wehr, A. Goodall, J. C. Price, A. Palm, J. Bussenschutt, A. Bussenschutt, G. Meier, and J. H. Nankervis (Hon. Sec.).

WHEAT GRUBS.—Several members reported wheat crops dying off in patches, and they attributed the damage to the ravages of underground grubs. Other matters of local importance were dealt with.

Penola, August 13.

Present—Messrs. Jas. Fowler (Chairman), J. W. Sandiford, D. Balnaves, H. Ricketts, J. Miller, and D. McKay.

HON. SECRETARY.—Mr. T. H. Artaud tendered his resignation as Hon. Secretary. The Chairman promised to act as Hon. Secretary until new appointment was made.

GRUBS.—The Gen. Secretary wrote *re* the ravages of the underground grubs (*Melolontha* sp.), which are very numerous in some parts of the district and are doing much damage. Considerable discussion ensued. Mr. Ricketts said he had tried nearly all the remedies recommended without avail.

LOCUSTS.—Mr. Stoney called attention to successful results obtained in South Africa in the destruction of locusts by inoculating a few with a fungoid disease, which rapidly spreads to the others.

RAINFALL.—For July, 4.46in.; for seven months, 13.84in.; an increase of 2.52in. over total to same date last year.

Mount Pleasant, August 12.

Present—Messrs. G. Phillis (Chairman), W. M. Vigar, J. Maxwell, W. Lyddon, J. McConnell, F. Thomson, P. Miller, jun., J. F. Miller, A. Baker, and H. T. Hull (Hon. Sec.).

STANDARD WEIGHT OF CHAFF.—It was decided to support proposal for adoption of a standard legal weight for chaff; it being the opinion of members that the bag should contain 40lb. net, and a ton 2,000lbs. It was pointed out that the railway freight is per ton of 2,240lbs., while the usual market rate is for a ton of 2,000lbs., and that inconvenience was caused by the different weights adopted. Members also agreed that header chaff should be sold with a distinct statement of its nature, as it is much inferior to ordinary chaff.

MANURES.—Members reported that the beneficial effects of the application of fertilisers to the crops was already apparent.

DAIRYING.—It was decided to ask that one of the Government dairy bulls be stationed in this district.

Gladstone, August 6.

Present—Messrs. J. Tonkin (Chairman), J. Brayley, J. King, J. Shepherd, E. Coe, J. H. Rundle, E. Matthiessen, C. Gallasch, B. Griffiths, J. Gallasch, J. Milne (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the ninth year of the existence of the Branch nine meetings were held, with an average attendance of nine members. Two homestead meetings had been held, two papers read and discussed, and, in connection with adjoining Branches, a Bureau Field Trial Society had been formed. A greater amount of interest had been manifested in the work of the Branch, and the year generally had been a successful one. Messrs. J. King, C. Gallasch, and J. Milne were elected Chairman, Vice-Chairman, and Hon. Secretary respectively for ensuing year. A vote of thanks was accorded to the Gladstone Corporation for allowing use of room for meetings free of charge.

BINDER AND STRIPPER.—Mr. King read a paper on binder and stripper and the conservation of fodder.

Richman's Creek, August 1.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, P. J. O'Donohue, J. A. Knox, J. McSkimming, J. J. Searle, E. Roberts, M. Hender, A. Nicholson, J. M. Kelly, and J. McColl (Hon. Sec.).

FLOUR MILL.—It was decided to heartily support the Arden Vale Branch in an effort to get a flour mill started at Quorn, the members being of opinion that a mill would be of great benefit to the district.

OFFICERS.—Messrs. W. Freebairn, A. Knauerhase, and J. McColl were re-elected Chairman, Vice-Chairman, and Hon. Secretary for ensuing year.

PLOUGHING IN SEED.—Mr. Roberts read a short paper on this subject. Ploughing in the seed was an old practice in this colony. In the early days, when scarifiers were not so effective as now, it was a common practice to plough the land a second time to destroy the wild oats and turn the seed in at the same time, the results being very satisfactory. When he came to this district, twenty years ago, his land was covered with blackoak scrub. This was cleared as well as possible, but owing to there being so much timber underground great quantities of roots were always ploughed up, and it was an endless job to pick these up so as to be able to harrow properly. The consequence was that he often sowed the seed on top, ploughed it in, and rolled it. The stubble was afterwards burnt, and by this means most of the roots destroyed. Four inches or 5in. was a good depth to plough in seed. Very little goes the full depth of the furrow, and nearly all is covered. There is much less risk of the seed malting when well covered, as, if sufficient rain falls to cause it to germinate, there will almost always be enough moisture to keep the plant going until further rain falls. If the seed is covered too deeply the plants will put out fresh roots near the surface, and the roots at a depth help to sustain the plant in a dry season. The objection to this method of putting in the crop is that it is too slow, as they could not wait until seeding time to do their ploughing. It is not advisable to plough in the seed unless the soil turns up moist and in good trim. Mr. Knox thought this system would not do where ants are numerous, as they would collect a lot of grain into heaps in a few hours. Mr. Knauerhase thought it would not have answered last season to have covered the seed deeply, as there was so little moisture that scarcely any would have grown. The Hon. Secretary said that ploughing in the seed was rather too slow; they tried it twenty years ago, but gave it up, as the ants collected the grain. The drills now in use would cover the seed to any required depth, would answer the purpose better, and were more expeditious.

FALLOWING.—A discussion on this subject took place. Mr. Nicholson said the earlier they started fallowing the better, though early fallowing would necessitate working the fallows later on, otherwise the weeds will have time to run to seed. Mr. Roberts considered one acre of early fallow worth two fallowed late, while Mr. McSkimming stated he got his best returns from land fallowed early and worked again. Mr. Knauerhase believed in working the fallow well. The Hon. Secretary would fallow early and harrow across if possible at once to level the land, as it was much easier to destroy the weeds later on by scarifying if the surface is level. Winter fallowing was the only effective way of cleaning the land, as they must have the weeds well started to destroy them before the summer sets in. By fallowing early more moisture was conserved in the soil for the crop. Mr. O'Donohue said in 1894, a very dry year, he well worked portion of the fallow and only harrowed the other, but the latter gave much better results. Other members advocated early fallowing.

BARE PATCHES.—Several members mentioned that bare patches were showing again in the wheat crops; and, after some discussion as to the cause, it was decided to have samples from some of these patches analysed, in order to ascertain whether there was any injurious constituent in the soil.

CROWS.—Several members reported that the crows were pulling up a lot of the young wheat and were generally doing a lot of harm. Remedial action was discussed, poisoning and shooting, to scare them away until the plants are stronger being suggested.

Koolunga, July 28.

Present—Messrs. T. B. Butcher (Chairman), J. Button, J. Butterfield, J. Jones, A. Craig, W. J. Jose, J. Sandow, R. H. Buchanan, W. T. Cooper, J. Freeman, R. Lawry, R. Jackson, G. Pennyfield (Hon. Sec.), and two visitors.

DISC PLOUGHS.—Messrs. Freeman and Sandow reported on trial of patent rotary disc plough. The work done in clear ground was very satisfactory, but in grassy land it was not a success.

FALLOWING.—The Chairman read a paper on this subject to the following effect:—

It has become a recognised fact in this district that nothing but fallow land can be relied on for wheat-growing. There are, of course, exceptions due to favorable and unusual circumstances; but it is very risky to rely on these. Early fallowing is essential. As soon as seeding operations are finished commence fallowing, and put on as many teams as possible to get it finished early. He considered two acres of early fallow worth three of late. Unless the season were wet he would not advise deep ploughing, 4in or 5in. being enough. In a dry season the shallower the ploughing the better, as the subsoil will then be in a better condition to retain what little moisture there is. Before fallowing, spread all the farmyard manure available, so that any seeds in the manure will be given an opportunity to grow. Thorough working of the land will mix the manure with the soil, and it will be in a readily available condition for the next crop. He believed that it would be better to plough the stubble under than to burn it, as by the time the land was again cropped it would be well decayed, and would afford some little assistance to the crop. It was of course not possible to finish fallowing before there was a fair growth on portion last ploughed, and he believed they were making a mistake in feeding this down close before ploughing; if it were turned under instead it would add to the fertility of the soil, and probably give a better profit this way than feeding. Too heavy stocking was impoverishing their land. To get the best results from fallow it must be thoroughly worked after ploughing. The subsoil should set down firm, while the surface is kept loose and friable; and in order to do this it is necessary to cross scarify once pretty deeply, then to harrow and lightly scarify whenever a favorable opportunity occurs, the object being to keep down the weeds as well as to open up the soil to the action of the atmosphere, and to get a fine tilth for the coming crop.

Mr. Button believed in early fallowing and the use of manure; if grass were not properly buried it would grow again and be troublesome. He recommended

cropping every third year. Mr. Jackson agreed as to the benefit of early fallowing, but not with ploughing in the stubble, as in a dry year it would not decay. He favored cross-ploughing in October instead of scarifying, and would crop every fourth year, with which Mr. Jones agreed. Mr. Freeman believed in summer fallowing, when practicable, as it gave better opportunities of cleaning the land. The depth to fallow would depend on the nature of the soil. Mr. Butcher said a question coming in for much consideration was whether it was more profitable to fallow every alternate year, or to crop one year, graze the next, and fallow the next—in other words, cropping every second or every third year. The three-year system is difficult to carry out, as, if the land is to be cleaned by grazing it must be fed bare, and if this is done they had a difficulty to keep their stock, unless a paddock of feed were reserved. Then, if any feed were allowed to go to seed the land became re-seeded with wild oats and other weeds. Then comes the question does this bare feeding pay? They were told by scientific men that bare feeding was almost as impoverishing as overcropping. He found the easiest way to clean the land and to get fair results was to fallow every other year, but was such action wise?

Carrieton, August 18.

Present—Messrs. W. J. Gleeson (Chairman), A. Steinke, R. Fuller, W. Steinke, G. Martin, J. F. Fisher, W. J. Byerlee, J. B. Harrington, and J. W. Bock (Hon. Sec.).

FOWL TICK.—Mr. Fuller said he had carried out the advice of the General Secretary in regard to remedies for this pest, and was pleased to say his fowls were now doing well.

MANURING.—Mr. Fisher referred to the advisableness of trying experiments with Kangaroo brand guano next season. Mr. Bock said he would take a ton if the other members would order a quantity, so that they could combine and get up a truck-load. Considerable discussion took place on the subject of manuring, and Mr. Byerlee said that from results in the southern districts superphosphate seemed to be most suitable for the North. If they were to do anything in the matter, they should obtain a number of different manures and carry out experiments.

SKINLESS BARLEY.—Mr. Fisher reported that this had proved very suitable for green feed in this district. Near Carrieton there was a nice plot which had been cut once, and there was now a nice second growth.

OFFICERS.—Messrs. W. J. Gleeson and J. W. Bock were re-elected Chairman and Hon. Secretary respectively for the ensuing year.

STANDARD WEIGHT OF BAG OF CHAFF.—A long discussion took place on the advisableness of adopting a standard legal weight for the bag of chaff, and it was decided that the delegates of this Branch should use their discretion as to their vote at Congress.

Naracoorte, August 13.

Present—Messrs. O. Hunt (Chairman), S. Schinckel, J. Wynes, H. Buck, G. Greenham, J. D. Smith, H. Smith. A. Limbert, D. McInnes (Hon. Sec.), and one visitor.

DATURA STRAMONIUM.—The Chairman said this weed, tabled by Mr. Buck, was fully described and illustrated in the August, 1897, issue of the *Journal of Agriculture*. It was very poisonous, and being on the list of noxious weeds it was the duty of all landowners to destroy it. He had noticed some plants growing on the reserves in the district, and on drawing the attention of the

local council to the matter, a man had been put on to dig them up. Unfortunately some of the pods had already ripened, and the place would require careful watching to prevent the further spread of the weed.

STANDARD WEIGHT OF CHAFF.—The Chairman initiated a discussion on this subject. He noticed it was engaging the attention of a number of Branches, and that a standard weight of 40lbs net per bag was advocated. He thought, however, there was already too much legislation, which only interfered with their freedom of action. A uniform bag of chaff could be adopted without any legislation. Several members, however, thought it necessary that a uniform standard should be adopted, and a resolution favoring 45lbs. as the standard was carried by a majority of one.

DAIRYING.—Considerable discussion took place on the best breed of bulls to introduce with a view to the improvement of the dairy herds of the district. The Chairman objected to Alderneys, as they had proved unsuitable, the cows being too delicate and not giving enough milk. He thought the Shorthorn crossed with the Alderney would prove very suitable. Mr. Greenham said the Alderneys were small and required less feed than the larger breeds. As their cows had often to go on short commons an Alderney would perhaps suit them best. Mr. Buck said whatever breed they had, if they wanted a good milking cow, they would have to feed her well. He would sooner have half-bred than pure-bred Alderneys. Mr. Wynes said there were a number of cows in the district got by Alderney bulls from the common cow which had turned out splendid milkers. Mr. Limbert said his experience with the Alderney had been satisfactory. Mr. J. D. Smith found that some of his Shorthorns gave richer milk than the Alderney.

CARE OF MACHINERY.—Mr. Schinckel read the following paper on this subject:—

All farming implements should be carefully overhauled every year. Do this work with each instrument as its work is completed for the year. Mowers, binders, strippers, and all such machinery should be thoroughly cleaned before they are put into their sheds. All main bolts and nuts should be loosened and a little oil applied before rescrewing. This will prevent screwing off nuts the following year, which is a great inconvenience to farmers, especially those living a long distance from a blacksmith, causing a lot of lost time, and time always means money in a busy time of the year. All implements should be painted at least every second year; in autumn, I think, is the best time to do this, as the wood is then perfectly dry. Painting farm implements will always make them last longer, save a lot of trouble, save blacksmiths' bills, and will certainly bring a better price if offered for sale than a neglected implement. Care should be taken to only use the best kind of oil for machinery. Some oils accumulate dirt far more than others, which is not good for bearings. I do not care for a thick or greasy oil. From my own experience I have found lubricating and lard oil best. At the beginning of the season I find a little kerosine for the first oiling very good to remove any grit or rust. I have seen farmers when harvesting is finished leave their machines in the paddock—I suppose to have them in early readiness for next year—with no shelter of any kind, only a tree. This is a very bad practice, for the little time and trouble it takes to put up a rough shed will repay itself in a very short time. It is also very important that the ground should be made nice and even to expect machinery to wear well.

Considerable discussion followed. Mr. Schinckel said the three main points requiring attention were—first, prepare the land well; second, be careful in oiling; third, shelter the machinery when not in use. The Chairman thought it a good idea to clean and repair the machinery as soon as done with, as if anything had gone wrong or it was not working as well as it should, they were fresh in mind. Mr. Limbert found lard and blacklead the best for oiling machinery, but the Chairman said that something freer was needed for binders and reapers. Mr. Wynes preferred to leave the old oil on until the following season, as it prevented rusting. Mr. H. Smith said Mr. Schinckel's suggestions were no doubt very good, but when he had done mowing he found it necessary to attend to his stack. It was not practicable to attend to some machinery when finished with.

SPRAYING FRUIT TREES.—The Chairman read a short paper on this subject to the following effect:—

It has become very common practice to spray fruit trees in winter with Bordeaux mixture, either to cure or prevent various kinds of blights. I have had some Sturmer pippin apples, very fine grown fruit and perfectly sound as far as could be seen when gathered, but a short time after a great many of them became very thickly pitted with black spots and decayed very rapidly. I also had a Cleopatra tree with one branch very badly affected when the fruit was on the tree. I sprayed them two or three times with Bordeaux mixture (summer strength); 1lb. bluestone, 1lb. lime, to 7½galls., and have not seen any more spots on the fruit of those trees. I have also used the same for pears with black spot with very good results. The best time for pears is when the leaves are just showing, as every bud then gets sprayed before the foliage becomes too thick. It has also done good service on apricot and peach trees for shot-hole and anthracnose on the vine. So much for the remedy for diseased trees. But to spray trees that do not show any sign of blight I think is wrong, for the compounds that are commonly used are injurious to the health and vitality of the tree. For my part I have been very zealous in trying to ward off the different diseases in my orchard, on the principle that it was better to prevent than have to try to cure. I will give a few instances, and take the peach first. Whether it is the different diseases or the continual spraying with different compounds, the trees will not keep in a vigorous state more than seven or eight years before they become very scraggy and the fruit small and indifferent. If the trees are headed-off, they start strong in a very short time, but soon give out completely. I do not know of one peach tree strong and vigorous in this district that has been treated for blight older than the time I have mentioned, but many younger trees are very scraggy, and the little fruit they bear is of very poor quality. I have apple trees that were blighted two years ago with red or brown spots on the fruit when growing, but soon after being picked the spots ran together and turned black and decayed in a very short time. The trees were sprayed three times last year with Bordeaux mixture, and this season I have to take them out, as the branches were dying back from the tips, the bark rotting and loosening from the wood, and my opinion is that the Bordeaux mixture had something to do with their destruction. I spray diseased trees, as they are as well dead as alive, but I do not spray generally as a preventive, as, if done, it is at the cost of the vitality of the tree. He urged the members to carefully watch the results of spraying operations for themselves. By using too much tobacco they would kill their trees, so it was clear that even a little was injurious.

Mr. Wynes said his trees are all strong and healthy and he never sprayed them. Mr. Buck said he could not get a peach tree to do, owing to ravages of peach aphid; he was recommended to try sheep dip, which he found effectual in destroying the trees and the aphid.

EXHIBITS.—Mr. Buck showed samples of eating apples and of green feed, the latter being 4ft. in length, grown on light sandy soil which had been rooted up by pigs and lightly manured. Mr. Schinckel showed weed growing and spreading on his land. It choked all the grass as it spread, and nothing seemed to touch it. It was very like a moss, and bore a small white flower. [A species of Galium, used for edgings by gardeners. Try ploughing it under at once. It must be destroyed somehow.—GEN. SEC.]

LUCERN.—About the latter end of August was considered the best time to sow lucern, and bonedust advised as the best manure to apply.

Strathalbyn, August 8.

Present—Messrs. M. Rankine (Chairman), B. Smith, W. J. Tucker, Hon. J. L. Stirling, W. M. Rankine, R. Watt, J. Cheriton (Hon. Sec.), and two visitors.

ANNUAL REPORT.—The Hon. Secretary's report showed that during the year eight meetings were held, with an average attendance of seven members. Four papers had been read and discussed, and at the Southern Conference held in March, six papers were read, and delegates from eleven Branches were present. Lectures had been given by Professor Lowrie, Mr. Grasby, and Mr. G. S. Thomson, the Dairy Instructor.

TUBERCULOSIS.—The Hon. J. L. Stirling read an exhaustive paper on this subject, quoting from various authorities on the danger of the disease being conveyed to human beings through the consumption of meat and milk from diseased cows, and the necessary precautions which should be taken, and the value of tuberculin as a means of detecting the disease in cattle. He also quoted reports concerning the presence of the disease in various countries, and stated that though in Australia the conditions under which cattle live are more favorable than in other countries, and the disease consequently not so prevalent, still it existed, but to what extent remained to be proved. It behoved the Government, in the interest of the welfare of the community, to amend the present health regulations, to counteract to the greatest extent possible the evils to which science had opened their eyes in this direction. There was no doubt that the realisation of a healthy food supply affords scope for energetic legislation, and that, to secure the best results, the producers of the meat and milk supply will be forced to submit to a degree of inspection which many will resent. There was no doubt that such action would be taken sooner or later, and it behoved the producers to be prepared for it, rather than to fight against it. Considerable discussion followed the reading of this paper.

Balaklava, August 13.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, J. Mills, J. Crawford, A. Manley, J. Vivian, G. Reid, P. Anderson, W. H. Thompson, and E. M. Sage (Hon. Sec.).

PEACH APHIS.—The Hon. Secretary reported that this pest was making its appearance again. He found nothing better for it than fumigation with tobacco, as every part of the tree is reached, whereas it was almost impossible to thoroughly wet every part of the tree by spraying. Calico for covering a good sized tree will not cost more than 10s., and it would be found very handy in the house afterwards. Mr. Reuter said he noticed that since he started using Bordeaux mixture he had very little trouble with peach aphids. The Hon. Secretary said Bordeaux mixture was not generally considered to be an insecticide. Mr. Sires found it almost impossible to give an effective spraying when the leaves were on the trees. His Brandis almonds were more affected than any others.

Hahndorf, August 20.

Present—Messrs. A. von Doussa (Chairman), F. H. Sonnemann, J. C. Rundle, H. Spoehr, H. Kerr, C. Jaensch, and D. J. Byard (Hon. Sec.).

SOURSOPS—Circular from Central Bureau discussed. This weed has not so far obtained much hold in this district. Mr. Kerr said at Balhannah he had considerable trouble with it, but had little success in his attempts to get rid of it. Only salt in large quantities was effective, but this rendered the land unfit for anything else for a time. The sparrows would eat the bulbs, but did much harm by disseminating them abroad. Mr. Spoehr said he had also been troubled with this weed, but had kept it in check by working the ground. Members promised to take steps to check the spread of the plant.

COPRA CAKE.—Mr. Rundle and the Hon. Secretary reported satisfactory increase in the quality of the milk from cows fed judiciously on copra cake.

INFERIOR CHAFF.—Attention was called to the practice of selling chaff made from headed wheat without any notification being given to the purchaser. It was suggested that such chaff ought to be branded to prevent fraud.

Brinkworth, August 11.

Present—Messrs. R. Cooper (Chairman), J. F. Everett, J. Graham, C. Horne, H. Cornish, S. Aunger, A. L. McEwin, A. W. Morrison, J. Stott (Hon. Sec.), and one visitor.

HORSE-FEEDING.—Mr. Aunger read a paper, of which the following is a short summary:—

He thought the principal food for a working horse should be chaffed hay. It will well repay to chaff the hay, because there is less waste of fodder; the horse does not waste time in "fossicking" for tit-bits as he does when the hay is long; it is more convenient to feed; it can be enriched with bran or corn, according to the work required. Some horses like variety, and a little long hay the last thing at night may be allowed. Horses do better upon good mixed hay—even mixed with wild oats—than upon pure wheaten hay. He preferred mixed Cape oats. Hay is in best condition when cut after the bloom is off and the grain nearly fully formed, and it will not lose half the percentage of weight that green hay will. Self-sown wild oat hay is very poor and wiry, but may be used for idle horses, and should be all saved against time of drought. Wheaten straw makes very good feed if cut with binder before it gets too dry after being stripped. If wheat is used as feed he prefers boiled to crushed wheat, as it is very easy for a horse to get too much crushed grain where several are feeding together, and this, he thinks, is liable to cause boils and sore shoulders. Boiled barley is a capital flesh former, and it will pay well to grow a few acres on light soil to cut with binder before it is dead ripe, when it can all be saved, and if thrashed with the header the straw will make good provender for idle stock and even for store pigs. For fast-travelling horses he preferred oats to any other grain, as it keeps them firm and does not affect the wind like wheat or barley. He strongly condemned the practice of substituting wheaten chaff for hay chaff, as hundreds of horses are made prematurely old by feeding on wheat chaff without sufficient bran or other nourishing food to pass it through them, more especially by the practice of sifting out the flag and bits of heads, which is the only part with any nourishment. The "chogs" and backbones of the ears are as indigestible and unnutritious as sawdust, and cause indigestion. The evil effects do not appear all at once, but are slow and sure. Five o'clock in the morning is early enough for the first feed, which will give one and a half hours for his breakfast, and leave him ready for work at 7. The next meal should be at noon, and be taken to him in the paddock, and the time thus saved can be taken off the end of the day's work. The midday meal-time should last one and a half hours, and his total day's work should not be more than eight or eight and a half hours. The third meal should then be given, but never more than he will clean up at each feed. Between 8 and 9 at night he should be fed up for the night and be left undisturbed till next morning. On large farms, where four or five teams are kept, it is advisable to have one man do all the feeding, who will see that each has proper feed and care. The drivers should clean their horses and attend to the harness. If the animals are well fed and cleaned every day they will not get the long shaggy coats which makes them sweat much more than they should do, and takes so long to dry that the horse gets cold right through when standing after the day's work. The stables should always be closed against the prevailing winds, which are from the west and north in this locality.

Mr. McEwin thought the weights of the various foods should have been given; good wheat chaff was better than bad hay. Bran was no good with wheat chaff, except for purging. Mr. Graham found good wheat chaff better than inferior wheaten hay for his horses; he gave about $\frac{1}{2}$ gall. crushed wheat to each horse with the chaff, and they were in as good condition as others in the district. The Chairman said he preferred crushed wheat to boiled, for his horses.

Port Broughton, August 1.

Present—Messrs. R. W. Bawden (Chairman), F. Dalby, R. Storr, J. Bates, H. H. Whittle, W. R. Whittaker, G. Pattingale, J. Harford, J. Barclay, W. Tonkin, E. Dennis, S. M. Bawden (Hon. Sec.), and two visitors.

OFFICERS.—Messrs. R. W. Bawden and S. M. Bawden were re-elected Chairman and Hon. Secretary respectively for ensuing year.

HARROWING GROWING CROPS.—In reply to question, members expressed the opinion that it would be beneficial to harrow the growing crop.

WOOL.—Mr. Harford read a paper on this subject.

Mount Gambier, August 13.

Present—Messrs. J. Watson (in chair), G. G. Collins, W. Mitchell, W. Barrows, D. Norman, sen., J. Dyke, T. Edwards, J. Bowd, J. C. Ruwoldt, M. C. Wilson, and E. Lewis (Hon. Sec.).

OSIERS.—The Hon. Secretary read the following letter from the General Secretary in reply to inquiry *re* cultivation of osiers:—"If osiers were grown in the South-East for local requirements only, there would be a profitable employment for many people, and the Industrial School for the Blind would probably start a basket factory there. Potatoes, onions, and other produce suffer great damage in transit under present conditions, which would cease were such things packed in baskets, which could be used again and again. Land must be deep, rich, moist (but not swampy). Tantanoola appears to be the *beau ideal* of osier country. Some of the best are Stone osier, Golden, *Salix caprea* (goat willow), *S. triandra* (Spanish red), *S. Forbyana* (New Spanish), *S. viminalis* (poor, except one or two varieties), *S. purpurea* (Bitter ornard; grows in very wet soil). Trench 18in., plant 18in. x 15in. for thin osiers, or 24in. x 18in. for Stone and larger sorts, running 8ft. to 12ft. long. Sets should be nearly half an inch thick at butt, 8in. long, buried to top eye or bud. Cut back first year to 1ft. high; take crop every year after. Cut when all leaves are off. Sheave or bundle the rods; lay in water by butts till they begin to shoot, then peel by aid of two square pins set up V-like on a bench."

SPARROWS.—Mr. Norman called attention to the increase of sparrows in this district, and suggested the Branch should ask the local authorities to take active steps to lessen their numbers. Unless some action were taken it would be almost useless attempting to grow fruit or grain. It was stated that the authorities had reduced the prices paid for eggs and heads, so that now the boys did not take any trouble to destroy the birds. It was decided to ask the local authorities to raise the price to what they had paid in former years. Mr. Bowd said he found sparrows could be prevented from pulling up peas as they begin to shoot by covering the shoots lightly by raking up the soil. As soon as the leaves opened the sparrows would leave the plants alone.

DAIRYING.—Some discussion ensued on the best breed of dairy cattle, and considerably different opinions were expressed. Some favored the Shorthorn, others Jersey, and others Ayrshire, while the Jersey-Shorthorn and Ayrshire-Shorthorn crosses were also recommended. Mr. Wilson said they noticed at the factory when testing milk that wherever there was a strain of the Jersey the milk was richer. Mr. Bowd said he had three Jerseys, which for milk and butter production would be hard to beat. One gave 12lbs. of butter a week, and a good supply of milk to within a fortnight of calving. Such a cow was more profitable than one giving a heavy yield of milk for a few weeks only.

Calca, August 6.

Present—Messrs. A. Newbold (Chairman), J. Bowman, W. Wilcott, R. H. Squire, A. Plush, D. P. Thomas (Hon. Sec.), and four visitors.

CATERPILLAR PESTS.—Mr. Bowman reported that a "grub" was doing great damage to his grass lands. These insects appear in different localities every season after the first winter rain and eat every vestige of vegetable life before them. Mr. Wilcott said the same pest was attacking his wheat crops.

WEEDS.—Members reported that a weed appears on mullenised land after the first year's crop, and choke the wheat unless pulled up by the roots. Some patches have been in existence for four or five years, where unmolested.

It was decided to send specimens to Central Bureau for identification. Mr. Wilcott said there was a weed growing very luxuriantly on his land. Its roots were very numerous, and choke the plough. Stock did not touch it. [Neither of these weeds had any flowers on. It is a matter of impossibility to identify plants unless the specimen bears flowers and, if possible, seeds. Will members of Branches please remember this?—GEN. SEC.]

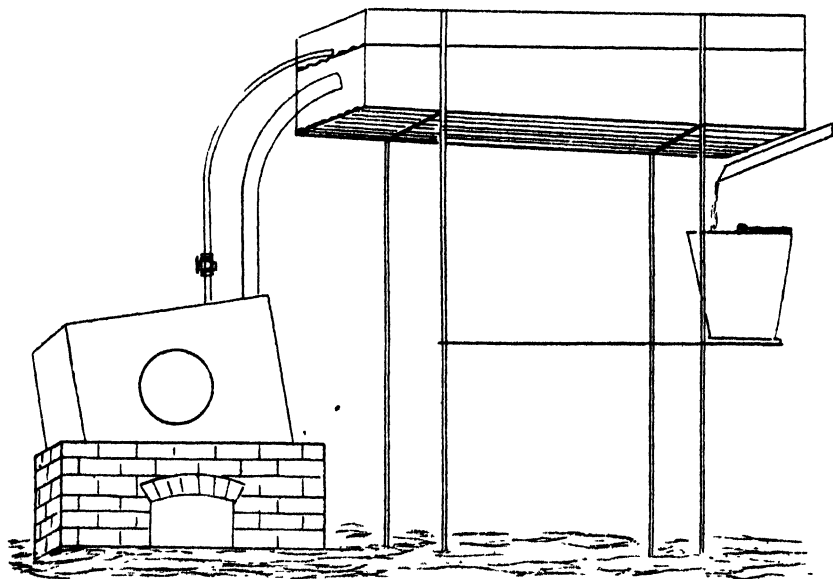
Elbow Hill (Franklin Harbor), August 2.

Present—Messrs. E. Wake (Chairman), C. G. Ward, W. Beinke, H. T. Styles, H. Dunn, W. Ward, James Spence, D. McKenzie, W. Spence, C. L. DuBois, G. Wheeler (Hon. Sec.), and nineteen visitors.

CROSS-BREEDING OF PLANTS.—Mr. Ward read a short paper giving his experiences in crossing flowering plants and peas.

WATER CONDENSER.—Mr. DuBois read a paper on this subject, to the following effect :—

In February last, having run short of water, I had a look round to find out where I could get a supply. My neighbors being in the same predicament as myself, fresh water was not obtainable within twenty miles, and at this spring you had to wait your turn, sometimes from twelve to twenty-four hours being wasted there. This meant having a team away three days of each fortnight, when the time was required for putting in the crop, and would result in having either 150 acres less under crop or putting it in late. I thought I would see whether I could not make a simple and inexpensive condenser from the materials on the farm, and found the following materials :—A 200gall. tank, an old scarifier, some bricks and stones, 4ft. of 2in. pipe, 4ft. 1in. pipe, three sheets of 9ft. galvanized iron, and some flooring boards. At first sight this does not look a very promising lot out of which to construct a condenser, but I propose to describe how I utilised these materials.



The scarifier was wheeled to a suitable position on an incline, the wheels and axles removed, and blocked up with bricks. The tank was then placed on the scarifier, with the manhole to the front on the lower side. This allowed the mud and other deposits to collect at the lower side where it could easily be removed, while the steam found its way out at the top, two holes being cut on the topmost edge of the tank. One was 2in. in diameter to take the steam pipe, the other 1in. in diameter to take the hot water from the top of the condensing chamber, as

will be mentioned later on. The tank was built round with bricks to height of about 1ft., leaving a clear space of 15in. for the fire. A box, 8ft. 6in. long by 2ft. 3in. wide by 1ft. deep at one end tapering off to 9in. at the other, made of flooring boards for sides and ends and a sheet of iron for top and bottom, was used as a condenser. A flute of iron cut from another sheet was soldered on to each side of the top of the condenser, and some tin soldered on to make a shallow watertight box, about 3½in. deep, on the top of the condensing chamber. Four posts, the required distance apart, were set up, and a strong crosspiece fastened to the two nearest the tank. The condensing box was placed in position, water placed in the top chamber to get the proper level, and the other crosspiece attached. This makes the top of the box level, with the bottom falling away from the boiler to the extent of 3in. Holes were cut in both the condensing chamber and the box above, and the pipes mentioned before securely attached. By allowing the heated water from the top of the chamber to run into the tank as soon as it got hot, much fuel was saved.

Having the apparatus fixed up, with outlet for the condensed water at lower end of condenser, the tank is filled through the manhole to depth of 18in., the fires set going, and the box on top of condenser filled with water, and with some clean rag fill up the corrugations in the end. In about forty minutes steam will begin to rush into the condenser, and spreading out on the under-side of the cooling tank condenses; the water running to the lower end is collected into a spout and conducted to the receiver. I found from experience that the cooling tank was not a necessity for condensing purposes, but was very useful, as when the water became hot it was let into the tank without causing loss of time. I found I could condense quicker with wood than stumps for fuel, and that, with the operations carried out as described, I could convert 8galls. to 10galls. per hour of salt water into fresh.

The actual cost of construction of such a condenser would be as follows:—

Tank	£1 15 0
Galvanized iron	0 9 0
Flooring boards, 40ft.	0 5 0
Nails, solder, &c.	0 1 6
Piping	0 5 0
Setting tank and labor	0 15 0
	<hr/>
	£3 10 6

Any handy man can construct a condenser similar to this one at practically very little outlay, as many of the materials required are to be found on every farm.

FARMING.—Mr. F. J. Brooks read a paper on "Theoretical and Practical Farming," to the following effect:—

He claimed for theorists a good deal of the practical results that have been secured by farmers, and gave stump-jumping implements, mullenising, scrub-rolling, &c., as practical results from theories previously entertained. Although the ideas set forth in agricultural publications might not suit all circumstances and every condition of climate, locality, &c., there is generally a stratum of practical utility in such articles, because they are usually written by men of experience and knowledge. He contrasted agriculture of the present day with the practices of fifty years ago, and showed the wondrous strides made in every direction, not only in machinery and implements, but in the methods of cultivation and of marketing and manufacturing or otherwise dealing with the produce. The lesson he drew from this was that the theorist should not be despised, but that the practical man should work side by side with him for the further advancement and improvement of agricultural pursuits. Coming to the practical side of the question, he inquired—Why are farmers' sons desirous to leave homes, where they should be comparatively free and independent, to exchange for servitude in the cities? It could not be because he must have a master, nor because the spirit of independence is less dominant in him than in his father, nor because the love for his calling and for rural life is dying out. The love of the country is as strong to-day as ever, as is manifested in the eager rush of the worried men of business, the overworked mechanics, and in short all the dwellers in cities for the country, on every possible occasion. Whence do they all retire for peace, quietness, and true enjoyment of life? Not to the city, but to the country. Whence does the well-balanced mind derive its keenest and purest enjoyment? From nature; and certainly no calling brings so closely nor so constantly into contact with nature as that of farming. No life is so free, so independent. The farmer looks upon the city with pleasure, because it is a market for his produce. He visits it upon occasion for pleasure as well as for profit, because his nature demands variety, even in enjoyment, and because, to keep pace with the rest of the world, he must be posted up in the latest things in literature, science, and art; but how eagerly he turns to his home in the country for that sweet rest and pure enjoyment which no city can afford him. Why then are his sons not like him? Because the practical part of farming is reduced to a drudgery. Can nothing be done to lessen it? He knew the many hardships and difficulties with which the average farmer

has to contend, such as poor yields, low prices, vermin, and drought. On a farm, work is never finished. We can always find plenty to do. Stock to be seen to, stumps to clear, shoots to cut, vermin to destroy, fences to look after and repair, and by the time all is completed harvest is again upon us and we have to begin the round anew. It is the looking forward to this ceaseless round of monotonous toil (often unremunerative enough to the son), without change or break, without cessation, year after year, which disgusts the young man with farm life. It is apparently all necessary, even indispensable; but, after all, should we know the difference, at the year's end, if he spent a day occasionally, or, if needs be, a week in the year in holiday-making? Give him an interest in things, something he may look forward to at the end of the year. Cultivate the interest he takes in the farm and the home as assiduously as you do your wheat crop. Do not bind him down to your own rules and methods; after all they may not be the best. A yard, fence, or shed, if well constructed, should require no further attention for years. But the poor beginner may be compelled to revert to makeshifts, and for these there may be some excuse; but I could mention instances where even prosperous men are guilty of this fault. We must bear in mind that a lessening of labor means an increase of profits, and the minimum of labor with the maximum of profits is our object.

Amyton, July 28.

Present—Messrs. A. Gray (Chairman), W. Mills, W. Hawke, James Gray, J. Burley, A. Stone, H. Turner, J. Kelly, and S. Thomas (Hon. Sec.).

TREE-PLANTING.—Mr. Thomas read a paper on "Fruit and Ornamental Tree Planting," to the following effect:—

To those who have been accustomed to living in or south of Adelaide and coming to what is familiarly known as "The North," the almost total absence of trees is one of the things that forces itself strongly upon them, and tends to give a very bad impression of the country.

I lately visited some of the towns, especially Jamestown, where some years ago there was a plain as bare of trees as our own, but is now one of the beauty spots of the North. Not only do trees beautify the place, but add materially to the salubrity of the climate. What has been so well done at Jamestown can and should be done in many other parts of the North. The country has gone to the expense of establishing nurseries at which hundreds and thousands of young trees are reared and distributed free. Also one day in each year is set aside by the schools for tree-planting and to give the rising generation an interest in tree culture, which it is hoped will grow as they grow. In America, where the timber forests are most extensive, the annual destruction of trees amounts to hundreds of thousands of acres, so that the exhaustion of the timber supply is only a matter of a short time. The immense monetary loss staring the Americans in the face roused them to action, and Arbor Day was the result. The idea caught on, and to-day forests fit for the axe and saw cover considerable stretches of country where barrenness reigned supreme, so that with continued planting the timber famine may be somewhat deferred. Some may be inclined to question the suitability of our district for tree culture judging by the poor attempts one meets with, but a glance about the school grounds gives evidence to the contrary, some trees having grown 18in. to 2ft. this season.

Looked at from any standpoint, tree culture will be found worthy of our keenest attention. In the first place, a row of trees acts as a splendid breakwind. Then shade is another consideration; but at the same time while obtaining these the ultimate use should be borne in mind. I mean their use as materials for sheds, fences, and for domestic wants. On almost every farm a portion can be well spared for tree-planting purposes, and this should be securely fenced in, as sheep and cattle are very fond of browsing on trees by way of variety. I would not advise the planting of trees around wheat lands, as they spoil the ground quite a chain in from the fence.

Another important point about tree culture presents itself, and in a district like this should receive every attention. I refer to the tree as a fodder. Our squatters in times of scarcity of herbage or bush are compelled to fall back upon the supply of fodder provided by trees, chiefly sandalwood and sheoak, and if these are properly trimmed will provide a supply during the dearth of other foods. In the *Journal of Agriculture* for January, 1891, page 98, mention is made of the tree lucern, which I think is worthy a trial here. It requires no special kind of soil, providing it is loose and well drained, as any excess of moisture is fatal.

As to the preparation for planting, much depends upon the soil and locality. The General Secretary, in commenting on a report of a similar subject as that of my paper, makes the remark that trees should never be planted in holes. I, for one, differ on that point, as I know trees that are well grown which were planted in holes. My experience has taught me that a hole about 2ft. square and 18in. to 2ft. deep, filled with surface soil or sandy soil, is as good a place as any. [If the soil is at all stiff or tough no tree will thrive if planted in a hole, and

even on loose soil it is best to plant on ploughed land.—**GEN. SEC.]** Now if all this preparation of holes were absolutely necessary, tree-planting on an extensive scale would suffer considerably; fortunately, it is not, as land ploughed—the deeper the better, so long as the subsoil is not disturbed—can be planted with every prospect of obtaining satisfactory results.

The planting itself should be carefully done, as any injury to the roots will keep the tree back. Roots that are exposed should be carefully examined, and all broken ones removed close up to the nearest sound wood, then treated to a mud bath to prevent loss of moisture and to supply same for immediate use.

In case of bamboo holders it is much simpler, as the insertion of the case is all that is necessary.

Staking the trees may appear a trivial matter, but it plays a very important part in the success of the plant. When once planted on no account should the roots be disturbed; hence the necessity for staking.

Most members disagreed with recommendation that holes should be made for the trees. They considered ploughing and subsoiling much better.

TRACTION ENGINES FOR FARMWORK.—The Hon. Secretary read a paper by Mr. Andrew Brooks on this subject, in which he stated that horses are excessively costly to maintain, especially in the dry districts of the North; that in seasons of drought the difficulty of maintaining them is greatly enhanced, that many of them die of starvation, whilst the rest are so weakened through want of sufficient food that they are unable to do a proper amount of work, so that the farmer is compelled to grow his crops in a slovenly way, and is nearly or quite ruined through the poor crops realised and by the cost of keeping his horses alive. He therefore advocated the employment of traction engines in place of horses, by which means all the fodder could be used for cows, beef cattle, sheep, &c. As there is at present no traction engine suitable for farmwork in Australia, he suggested that a fund of £1,000 should be raised by subscription amongst farmers, to be handed over to the Government to be offered in prizes for the invention or introduction of a traction engine that will enable farmers to dispense with the greater number of their horses. Members agreed that a suitable traction engine would be of great value to farmers, and agreed that an inducement should be offered to manufacturers and inventors. The Hon. Secretary thought the bare fact of offering a substantial bonus for such an engine would show engineers that there was a demand, and would have more effect than the actual money value of the bonus in inducing manufacturers to take the matter up. It was suggested that it would only be fair to ask the Government to subsidise any money raised for this purpose.

Tatiara, July 30.

Present—Messrs. G. Ferguson (Chairman), C. H. W. Wiese, T. Hall, T. Stanton, G. Milne, J. Green, H. Killmeir, D. Makin, R. Scown, and W. E. Fisher (Hon. Sec.).

POULTRY.—Mr. Stanton read a paper on this subject.

Anyone going in for poultry-keeping should first provide good housing and shelter. The houses should be in proportion to the number of fowls to be kept, the greater portion being for roosting place. Do not allow of overcrowding; 100 fowls is quite enough in any house, however large. For roosts hang wires from the roof, with loop at bottom 3in. or 4in. in diameter, and fit into the loops bullock or mallee sticks. The roosts should be about 18in. apart and 3ft. from the ground. The house should be cleaned out twice a week at least, and to do this conveniently remove the perches from the wires. After cleaning, sprinkle the floor well with dry ashes or lime. Smaller nesting houses with suitable nests are required; if houses are provided for the hens to lay in, the crows, which are such a source of annoyance to many people, will not get at the eggs. The hatching house should be closed in, so that the fowls cannot disturb the hens that are sitting. Take hens from the laying houses at night, after they have been clucky for two or three days, and put them in the hatching house with the eggs. You will then have no trouble from their leaving their nests. It is a good plan to set two hens the same day, so that when the chickens hatch they can all be given to one hen to look after, which they can manage all right with a little care on the part of the owner. The hen and chickens should be kept in a nice size house, free from draughts. It must be

kept very clean, and have a few small holes in the sides to allow the chicks to get out in the sun. The hen must not be allowed out, as she is apt to take the young chicks too far or to lose them, or the crows or hawks may take them unless close to secure shelter. For the first twenty-four hours the chicks require no feed, but in very hot weather a little sweet milk may be given them. The second day give a little pollard mixed with milk. Mix with the pollard when dry about one teaspoonful of poultry spice to two cups of pollard. Feed twice a day with this, and give a little crushed corn, also about a handful of lettuce or thistle at mid-day. On the third day give a little sulphate of iron in water or milk, never give them sour milk to drink, but warm it over a fire, squeeze out the curd and give it as feed. When the chicks are about three weeks old they can be given corn and the hen allowed to run out with them. They must be kept always in good condition, or they will develop into poor small birds. Save all eggshells, dry them well and grind them up fine for the chicks, as they make the best grit. At about four or five months old the young roosters should be shut up in a warm dark house for fattening. Give as much dry corn as they will eat at first. I find that boiled screenings and warm vegetables in the morning, green food at mid-day, and good screenings or wheat at night a satisfactory ration for fattening purposes. It is a good plan to add a little sulphur and salt to the morning meal twice a week, and to the drinking water, which must be clean, a little sulphate of iron should be added once a week. If the birds were in proper condition, they will fatten in from two to three weeks. I do not propose to deal with the best breeds, as the "Poultry Notes" in the *Journal of Agriculture and Industry* give full information on this point.

Mr. Milne considered the paper a very practical one. He knew Mr. Stanton had had a great deal of trouble with crows and hawks, but he had surmounted these and other difficulties, and had a splendid lot of fowls. The Chairman believed in housing the fowls properly, though he was afraid they were too often allowed to roost on the top of sheds, fences, or pigstyes.

SAND IN HORSES.—A discussion on this subject took place. Mr. Scown said he had frequently had horses suffering from this trouble, but he found the following treatment always successful:—Mix a quantity of pollard with water to thickness of gruel, put it in a trough and allow the horses to drink, then give a drench of about $\frac{1}{2}$ lb. of Epsom salts and ten to fifteen drops of nux vomica. Mr. Hall said he found this remedy very effective.

Clare, August 12.

Present—Messrs. G. Lloyd, (Chairman), W. Kelly, J. Radford, J. T. Hague, J. McCarthy, J. Treleaven, W. Kimber (Hon. Sec.), and one visitor.

CROWS.—Mr. Radford called attention to General Secretary's remarks in favor of the crow. The Chairman said he could speak feelingly of the sad havoc caused amongst lambs. Other members stated that the crow was one of the most destructive of birds in the orchard as well as in the wheat crop, and, in view of the very many testimonies as to the damage done by this bird, it was decided to ask the General Secretary to state a few of the bird's good points. [The crow is a large bird with omnivorous appetite, is always hungry, and remarkably smart in finding grubs, &c., beneath the soil as well as on the surface. It can hear the grubs at work on the roots of plants, and digs one up at every peck. A flock of crows will destroy millions of young locusts, caterpillars, grubs, &c., every hour of the day, and they begin work early and finish late. These are a few of the many good points about crows. Observant people will note a great deal more in favor than against these much-maligned birds.—GEN. SEC.]

APPLES.—Mr. W. G. I ewcock tabled two samples of Rome Beauty apples of good color and fair eating quality. He could not understand the objection of members to this apple. One good characteristic about it was that it was late in blooming and hence a regular bearer. The Hon. Secretary said he had been unable to secure any quantity of this apple of good color. He had left some on the trees very late, and although the color improved the eating qualities were sacrificed. Mr. Kelly thought as the trees got older the color of the fruit

would improve. Mr. Hague tabled King of Tomkins County apple. The fruit was highly colored and a good keeper; it had been allowed to hang on the tree until May so as to develop a good color.

HON. SECRETARY.—Mr. Hague agreed to act as Hon. Secretary for ensuing year in place of Mr. Kimber, who resigned.

Yankalilla, August 19.

Present—Messrs. E. C. Kelly, (Chairman), J. Butterworth, G. Newbold, J. Grundy, A. Wood, James Mayfield, H. Leverington, and G. H. MacMillan (Hon. Sec.).

SALE OF DISEASED FRUIT.—A member reported that diseased oranges were being offered for sale in the district. The Hon. Secretary was instructed to ascertain whether this could not be prevented. [Yes, if the insect or disease has been proclaimed under the Act. Specimen must be forwarded before definite information can be given.—GEN. SEC.] Other matters of local importance were dealt with.

Stansbury, August 6.

Present—Messrs. Alex. Anderson (Chairman), P. Anderson, J. Henderson, G. Brundell, P. Cornish, J. Antonio, J. Sherriff, C. Faulkner, and G. Sherriff (Hon. Sec.).

UNDERGROUND GRUBS.—Letter from General Secretary was read and some discussion ensued.

SHEEP-BRANDING.—Mr. P. Anderson asked which was the best preparation for branding sheep. Some brands became obliterated in a few months. Several members said they used lampblack and boiled oil, mixed some little time before using.

Port Germein, August 20.

Present—Messrs. E. McHugh, (Chairman), J. K. Deer, W. Broadbear, W. Head, W. Mortess, A. Thomson, J. Bews, W. Crettenden, G. Stone, H. H. Glasson, H. J. Gluyas (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year various experiments with seeds had not been successful, owing to the severity of the season, the rainfall being much below the average. The wheat and hay crops suffered from the same cause, and owing to the absence of their ordinary food, native berries, &c., the fruitcrop suffered severely from ravages of small birds. The sparrows are also very destructive, and are unfortunately increasing at a rapid rate. The Hon. Secretary regretted the members did not manifest more enthusiasm in the work of the Branch, the average attendance being only seven. He hoped an effort would be made during the coming year to supply a few papers on practical subjects.

WEED.—Mr. Crettenden tabled weed, commonly known as iceplant, which is taking possession of a considerable area of land. To be sent to Central Bureau.

PLOUGHING AND HARROWING.—Mr. Head called attention to the injury likely to result from the use of the paring plough for fallowing, and a general discussion ensued, there being considerable diversity of opinion as to whether it was advisable to use these ploughs for fallowing. A short discussion took place on the question of fixed versus stump-jump harrows, the majority of the members favoring the former because it covered the seed better.

Mylor, August 20.

Present—Messrs. W. Nicholls (Chairman), R. S. Mundy, W. T. Elliott, P. P. Probert, T. Mundy, W. H. Hughes, S. W. Jackman, S. Roebuck, F. Rosser, F. G. Wilson, and W. G. Clough (Hon. Sec.).

DRAINAGE.—At previous meeting Mr. Elliott read a paper on this subject. He said the question of the best and cheapest way of making underground drains was one of great importance to them, as the gullies must be drained, otherwise they cannot work the soil soon enough to get in their second crops before the soil gets dry. He had also noticed that the soil was moister in summer on drained land than on undrained. He had put down several drains, using different materials, but only one worked rightly; it was made as follows:—The drain was taken out and allowed to stand open through the summer; then the sides were built up to required height with stone, covered with good flat stones, and filled up to within 18in. of the surface with stone of all sizes. The earth was then put back and piled about 9in. above the surface to allow for sinkage. An underground drain, however good, is of little use unless properly attended to. The cultivated land should be dug deeply to allow the water to penetrate, and so reach the drains, otherwise the surface gets saturated and the water hangs about. Some growers say by digging deeply your manure is lost, but he did not think there was anything in this; if the soil is so very open underneath the land had better be left to grass, as if it will not hold the manure it will not pay to work.

HILLS CONFERENCE.—Arrangements in connection with the Conference of Hills Branches, to be held at Mylor on October 28, were dealt with.

POTATOES.—Mr. Probert read a paper on "Potato-growing." In this district the best time to plant is about the end of December. The setts should be about the size of a small hen egg, and must have sprouted. Plant 9in. apart in rows 2ft. apart. He found good results from manuring with $\frac{1}{4}$ cwt. Kangaroo guano and 1lb. sulphate of potash per rod. In wet ground plant Beauty of Hebron or White Elephants about end of January. For a spring crop, plant about the middle of September, using Early Vermont. Unless the land is sheltered on the east, the crop will be liable to frost until late in November. The potato field should be planted across the slope to allow of irrigation, as it is necessary to keep the soil moist while the plants are flowering. After they have finished flowering, nothing is gained by watering them. When the plants are about 3in. high, loosen up the soil between the rows, and top dress with slacklime. When about 6in. high, bank up the plants for 3in., and do not again disturb the soil. To keep his seed, he plants a bed about the end of September, nips off all the flower buds, and digs them in January when thoroughly ripe. The tubers are sent to the plains for early planting, and are ready again for his Christmas planting. Seed from this planting can be kept till September.

Johnsburg, August 6.

Present—Messrs. F. W. Hombsch (Chairman), G. H. Dunn, T. A. Thomas, W. James, J. R. Masters, L. Chalmers, T. Potter, W. McRitchie, and three visitors.

CONGRESS.—Considerable discussion took place on Mr. Thomas' paper on "The Establishment of a Reserve Fund among Farmers." Members did not agree with the General Secretary, that the paper was not suitable for Congress, and were of opinion that much good would result from a discussion on the paper, and some scheme more practicable might be carried out to the benefit of the whole of the farmers of the colony. [Members will have an opportunity of discussing this paper on Friday, September 9.—GEN. SEC.]

STANDARD WEIGHT OF CHAFF.—The Chairman initiated a discussion on this subject. Members thought the matter could well be left to mutual arrangements between seller and buyer. It was also thought that by the adoption of a standard of from 40lbs. to 50lbs. per bag, the use of branbags and woolpacks would cease, to the great inconvenience of many.

Kanmantoo, August 5.

Present—Messrs. T. Hair (Chairman), J. Downing, W. G. Mills, T. Hawthorn, F. Lehmann, John Mullins, P. Lewis, and A. D. Hair (Hon. Sec.).

STANDARD WEIGHT OF CHAFF.—A discussion took place on this subject, members being of opinion that 50lbs. per bag would be a convenient standard to adopt, as that weight could be easily put into the second-hand bags generally used, only a little extra attention on the part of the man at the elevator being required. The adoption of this standard would lead to a saving of bags. It was also thought that should any legal standard be fixed for the bag of chaff, the ton should also be fixed at 2,000lbs., and that there should be a distinction between header and ordinary chaff.

MANURES.—A member wished to know whether nitrate of soda and kangaroo brand guano could be profitably mixed before applying to the soil.

GUMMING OF FRUIT TREES.—Mr. Mills said he noticed one of his plum trees was gumming badly, and on cutting the affected part—the fork of the tree—he found a large white grub, about 2in. long, in the heart of the tree. He would like to know whether there were any preventive measures that could be adopted. [The gumming was caused by the action of a fungus upon the sap of the tree exposed by the boring of the grub. A watch should be kept for traces of borers, and where found destroy the insect by forcing a thin piece of wire into the hole, or by putting in some wadding dipped in bisulphide of carbon and closing up the hole. All diseased bark should be cut away and the wound covered with paint, and then sprinkled with sand.—GEN. SEC.]

SEEDING.—Mr. Mullins said he was misreported in the *August Journal* in regard to quantity of seed to sow per acre. He considered 1bush. per acre sufficient, not 1½bush.

Minlaton, August 20.

Present—Messrs. H. Boundy (Chairman), S. Vanstone, W. Correll, James Anderson, D. G. Teichmann, J. Martin, M. Twartz, J. Bennett, A. McKenzie, H. Ford, and Jos. Correll (Hon. Sec.).

SEED DRILLS.—Mr. W. Correll read a paper on this subject to the following effect:—

Seeding being finished, he thought this a good opportunity to bring the subject of seed drills forward for discussion, and would invite criticism of the opinions he would express. This part of the Peninsula has taken a prominent part in the introduction of the American seed and fertiliser drills, and the practice of drilling in the seed with fertilisers is rapidly extending, the greater part of the present crop has been so sown. There are several English and Swedish drills in the district that have done good work, but the seed and manure require to be mixed together before placing in these drills. He would, however, confine his remarks to the American drills.

Distribution of Seeds.—The most important points are that the drill should distribute both seed and manure evenly, and in the required quantities. Little fault can be found with the distribution of properly cleaned wheat; but it is important to bear in mind that all grain to be drilled in must be well winnowed, so as to free it from chaff, straw, or heads. The quantity sown is from 30lbs to 60lbs. wheat per acre, according to time of sowing and stooling qualities of the variety sown. Some difficulty has, however, been experienced with oats, both Cape and Algerian, in sowing from 40lbs. to 60lbs per acre. At its slowest speed our "Farmers' Favorite"—a fourteen-hoe drill—sows 60lbs. per acre. To sow less we put strips

of leather about the thickness of a lead pencil to partly close the outlet, which, although a good makeshift, requires to be carefully cut to required length, so that the ends do not interfere with the grain falling down the tubes. Farmers should not be obliged to resort to such means of regulating the quantity of seed sown. Our drill sows peas without cracking them which is a great convenience. He considered the wide outlet with slower gearing better for oats than a smaller outlet and higher gearing.

Distribution of Fertilisers.—In his opinion the force-feed device of the "Farmers' Favorite" is the best. Some difficulty has been experienced in getting so small a quantity as 70lbs. of Thomas phosphate meal through. It would be of great convenience if the makers would supply drill prongs or cones to distribute smaller quantities of this fertiliser. The prongs in our drill can be made to do this by cutting off a piece of the prong, but this does not in any way improve the evenness of feed. A ring of fencing wire under the cone-feed will also lessen the quantity passing through. Damp and pasty manures have given a lot of trouble, and caused a number of breakages, besides a lot of extra wear. Damp manures, especially in quantities of about 1cwt., do not distribute evenly, but pass through in lumps, or fail to fall on the distributor, causing unevenness in the crop. A device, such as a bar along the manure-box, with spikes, operated by a stud on the wheel, with a stroke of about 3in., and a spring relief so that when the box is full the stroke is short, would be useful; but the best way out of the difficulty is to use only dry fertilisers. An excess of acid may cause the fertiliser, on analysis, to show a greater percentage of soluble phosphate; but he questioned whether this would be any advantage in their Peninsula soils containing, as they do, alkalies. From experiments and observations he was strongly of opinion that the most suitable fertiliser for this district was a dry one in a very fine state of division, with the ingredients thoroughly mixed. So far this season Thomas phosphate meal with 10 per cent. of sulphate of potash added is showing best results.

South Australian farmers favor shafts rather than the pole for the drill, and in this district many have had the poles removed. On our soils we generally require one horse more than the makers allow for, also longer swings. Drills 8ft. and over do well with shafts for two horses with roller for back chain on middle shaft. Two horses are better than one for turning at the ends. Some drills with poles are heavy on the necks of the horses, and having to walk over four or five hundred acres, they do not want a load on the fore legs. Some of the drill wheels are too light. He had seen some with the rims getting flat between the spokes after only one season's work. Jump springs are a great improvement on the break pins on rough land, and give little trouble. The pressure springs are useful in getting the hoes the required depth in land that has set a bit hard, and are well worth the extra cost. The surveyors attached to several makes of drills and of different shipments are not reliable; some over measure, while others go under. In several instances where the farmers were drilling for others at per acre some loss was incurred before the mistake in measurement was discovered. In the drill we use there is a set-screw for adjusting the depth of gearing, and it needs considerable adjustment in changing the gear wheels on the studs of the gear case. Farmers do not always attend to this, and he had seen a drill badly worn owing to want of this attention. It would be better to have notches on the gear case so placed as to require no adjustment on changing speed. Some drills have too shallow depth of bevel wheels without any means of adjustment. New wheels will be required on these sooner than they should. A more convenient means of oiling would be an improvement. In regard to width, the thirteen hoe, 7in., is good, and four light horses can work it through the season, and allow of the use of pressure springs. An odd number of hoes is best if you want to sow peas or other seeds in wide rows. Some difference of opinion exists as to best width between the rows. A good deal depends on individual circumstances. A 7in. drill will cut up more weeds than a wider one, and gives a better chance of smothering any weeds that may come up between the rows, but is harder to pull. He considered the 7in. and 8in. both good, the 8in. being best for early good stooling crops.

In the discussion which followed Mr. A. McKenzie said he had had some difficulty with his "Champion" drill in sowing oats, and had to mix ashes or dry earth with Thomas phosphate to get the required quantity through. Several members complained of stones in the manure, and reference was also made to incorrect measurement by some drills. Considerable discussion took place on the subject of manures, and Mr. Ford pointed out how much better it would be for the farmers if they estimated the value of the manure when buying on the unit system.

FERTILISERS ACT.—It was unanimously resolved that this Branch is of opinion the Amended Fertilisers Act should contain a clause compelling vendors of all commercial fertilisers, except stable manure and refuse, but including guano, to give a certified analysis showing percentage of phosphoric acid, soluble and insoluble, nitrogen, potash, and sulphuric acid.

Craddock, August 20.

Present—Messrs. R. Ruddock (Chairman), J. Ramsay, P. Gillick, J. H. Lindo, M. Ryan, A. Clarke, J. Turner, J. C. Clarke, J. Patterson, and B. Mansom (Hon. Sec.).

BRANCH WORK.—Owing to the long and protracted drought the Branch has been in recess for nearly two years; but, notwithstanding this long period of inactivity, members are determined to make the Branch a success, the change of season having given them new interest in the work. Several members spoke of the great help the *Journal of Agriculture and Industry* had been to them in their difficulties. Mr. Ruddock was re-elected Chairman and Mr. J. H. Lindo elected Hon. Secretary for ensuing year.

FRUIT TREES DYING.—Mr. Ramsay stated that at Yednalue fruit trees grew well until four or five years old and then died away. On being taken up, the roots were found to be infested with small worm like insects and white ants. He would like to know if anything could be done to prevent these from eating the roots.

WHITE PATCHES IN WHEAT CROPS.—The Chairman said he had been requested to ask the members whether they had noticed any white patches in their crops. A resident of Yanyarrie told him there were such in his land, and the plants died off, while immediately around them the crop was healthy and unaffected. None of the members had seen anything of this sort in their crops.

Orroroo, August 20.

Present—Messrs. J. Moody (Chairman), E. Copley, J. Jamieson, S. Roberts M. Oppermann, H. C. Ives, E. D. Kirkland, W. S. Lillecrapp, and T. H. P. Tapscott (Hon. Sec.).

BUSINESS.—A number of communications from various sources were received and dealt with, and matters in connection with forthcoming Congress discussed.

Pyap, August 13.

Present—Messrs. G. A. Clarke (Chairman), T. Teale, K. F. Huselius, W. Axon, T. Smith, A. J. Brocklehurst, J. Holt, J. Harrington, E. Robinson, C. Billett, J. Bowes, B. T. H. Cox, W. C. Rodgers (Hon. Sec.), and one visitor.

POTATOES FOR SEED.—Several subjects were suggested for discussion at the forthcoming Congress, including the best way to keep potatoes for seed for several months without their sprouting. Experiments had been tried on the settlement with the following results:—(1) In dry sand they kept fairly well; (2) in perfectly dry ashes they kept good from May till August, when they were just shooting and ready for planting; (3) in dry straw, and covered with galvanized iron to keep out the moisture; and (4) in a dark room with plenty of ventilation gave equally good results as No. 2; (5) really best results were obtained from storing in bags, though the seed was not so forward. Except this last lot, all the potatoes were rinsed in cold water, and some treated with Paris green; others with sulphur, and no signs of moth were found in them. Those kept in bags received no special treatment. These potatoes were all from irrigated crops. Mr. Huselius found potatoes grown with the natural rainfall kept well, and he thought the difficulty in keeping might be due to irrigation.

ONIONS.—Members would like to know the best way of storing onions.

Angaston, August 13.

Present—Messrs. R. Player (Chairman), S. O. Smith, E. Thamm, F. Salter, A. Friend, J. E. Swann, A. Sibley, J. Vaughan, W. Sibley, F. Thorne, and E. S. Matthews (Hon. Sec.).

WEED.—Mr. Vaughan tabled weed supposed to have caused death of various animals. [This is *Fumaria officinalis*, and is absolutely harmless to stock, though, like clover and other succulent growths, it may cause death from bloat if eaten greedily while wet. It is, however, a troublesome weed in the crops.—GEN. SEC.]

"JOURNAL OF AGRICULTURE."—It was decided to consider items from the *Journal of Agriculture and Industry* at the meetings of the Branch. The Hon. Secretary read paragraph from the August issue re visitors at Bureau meetings, and urged each member to carefully consider the matter, and see if they could not induce at least one to attend.

SPRAYING.—A general discussion took place on the spraying of fruit trees. [If only one item of interest to other growers was brought out in this discussion it is a pity it was not recorded in this report.—GEN. SEC.]

Clarendon, August 11.

Present—Messrs. A. Harper (Chairman), J. Wright, J. Chapman, W. Spencer, R. Hilton, W. A. Morphett, D. Bilney, S. Bottrill, H. Payne, A. A. Harper, J. J. Piggott, and A. L. Morphett (Hon. Sec.).

SPECIAL PRIZES.—It was decided to offer several special prizes for best exhibits of vegetables, fruit, green fodder, and farm produce shown by members at the annual meeting in February. It was thought this would lead members to take more interest in the growing of produce for shows.

FRUIT TREE PLANTING.—A long discussion on this subject took place. Members were of opinion that it was advisable to plant a few trees each year to keep pace with the times. They thought that the various fruit pests would in future be kept under, and that there was money in successful fruit-growing.

POTATOES.—Mr. Harper showed two large White Elephant potatoes, one weighing 3lbs. and the other just half that.

Inkerman, August 23.

Present—Messrs. S. Diprose (Chairman), E. M. Hewett, D. Fraser, W. Board, S. Wills, and W. A. Hewett (Hon. Sec.).

SOURSOPS.—Members reported that this weed exists over a limited area in the district, but hitherto it has not been considered necessary to take any vigorous action to destroy it. They wished to know whether there was any danger of spreading the weed by gathering it with the hay.

AGRICULTURAL COLLEGE.—It was decided to endeavor to arrange with Nantawarra and Balaklava Branches for a joint visit to the Agricultural College.

Narridy, July 16.

Present—Messrs. A. Bairstow (Chairman), J. C. Myatt, A. McDonald, H. Nicholls, R. Satchell, J. Liddle, D. Creedon, and J. Darley (Hon. Sec.).

POULTRY FOR EXPORT.—Mr. Myatt read a paper on poultry-breeding for export. He put the Indian Game × Dorking first, then Malay × Dorking, Indian Game × Langshan, Malay × Partridge-Cochin. He had one of the

latter crosses weighing 10 lbs., but the objection to them is the yellow skin. He would advise farmers to dispose of all their roosters, and get either an Indian Game, Dorking, or Malay, and mate with the best fowls. Set the eggs from these, select the pullets, and cross them with fresh roosters of one or other of the breeds mentioned. In three or four years they would have a splendid lot of birds, worth four or five times as much as the present mongrels, and costing no more for food. In-breeding was a great mistake, and must be avoided. When a bird dies from any disease, burn the body to prevent contagion. Separate the birds to be kept for breeding when moulting is finished. If shut up, care must be taken to keep the houses thoroughly clean, and give plenty of variety in their feed. Occasionally the fowls should be given a little greenstuff. Wheat may be given boiled, soaked, or dry; scrap meat of every description should be saved for the poultry; bonedust occasionally is beneficial. A little pollard and soft peas added to the food will be found useful. In very cold weather add a little cayenne pepper and ground ginger to the feed. Provide a dust bath—fine fresh sifted ashes being the best for this purpose. Feed young chicks well, and keep them in good condition. They will be fit to market at about seven months old. He preferred the Pekin and Aylesbury ducks, and a bronzewing turkey to cross with the common turkey hens.

OFFICERS.—Messrs. A. Bairstow and J. Darley were re-elected Chairman and Hon. Secretary for ensuing year.

Port Lincoln, August 19.

Present—Messrs. S. Valentine (Chairman), J. P. Barraud, W. Laidlaw, K. S. Browne, W. Hutcherson, J. Puckridge, W. E. Goode, J. Anderson (Hon. Sec.), and several visitors.

IMPROVEMENT OF STOCK.—It was decided to endeavor to obtain the loan of one of the Government bulls, also of an entire horse for service in the district.

PIG-BREEDING.—Mr. Barraud read a paper on this subject:—

The breeds of pigs most approved are the Berkshire, Chinese, Poland-China, and improved Essex. The sow should be at least ten months old before she is fit to breed from, she goes with young a little more than four months, and often has two litters in a year, generally producing a numerous progeny, consisting of from eight to sixteen at a litter. Breeding in and in is calculated to produce degeneracy in size, and also to impair the fertility of the animal; it is therefore to be avoided. The best season for producing litters is the autumn, when with early rains there will be green feed for the sow and young ones, which will much reduce the cost of rearing the young pigs. When first dropped they are very delicate, and not unfrequently the young are crushed to death by the mother, in consequence of their nestling unseen beneath the straw. To prevent this risk a small quantity only of straw, dry and short, should be placed beneath them. Pigs can be most profitably kept in conjunction with dairying, as the skimmed milk is so well adapted for the young at weaning time, which would be when they are six or eight weeks old. A great object ought to be to feed well from the commencement. The food then tells immensely, whereas the cost and difficulty of bringing up lost condition resulting from insufficient feeding is very great. The piggery should be so situated as not to be offensive, and yet be easily supplied from scullery or dairy. There should be a separate yard or sty for the weanlings; and for pigs in all stages of growth and condition a clean dry bed is indispensable, but if manure be an object (as it should be to all small farmers) the green food should be supplied in a confined yard, in order that their manure should be incorporated with it. Litter abundantly supplied will produce an amazing quantity of manure even from a single pig. Young pigs require a great deal of liberty, which promotes their growth and healthiness. Pigs in the actual process of fattening should be confined altogether, so that they may eat and sleep alternately, without any of those disturbing influences that would be likely to disturb digestion. The walk and movements of the pig should also be regarded; if these be dull and heavy, ill health is to be suspected. There cannot be a more unfavorable symptom than a hung-down, slouching head, carried as though it was too heavy for the animal's shoulders. The diseases to which a pig is most liable are measles, fever, mange, and staggers. A large proportion of these is due to uncleanness and injudicious feeding. A pig put up in good store condition can be made fat enough by feeding on scalded pollard for three weeks, given without too much liquid.

Forest Range, August 25.

Present—Messrs. J. Vickers (Chairman), G. Monks, A. Green, J. Green, J. Sharpe, S. A. Collins, W. Cherryman, R. E. Townsend, H. Caldicott, J. Caldwell, R. M. Hackett (Hon. Sec.), and six visitors.

APPLE-GROWING.—Mr. A. Green read a paper on this subject. One of the chief points to study was the selection of suitable varieties for market and export. In both instances they should select varieties to make successional crops. For market, the best *early* apples are Juneating, Early Margaret, Red Astrachan, and Gladstone; *medium*—Summer Pearmain, William's Favorite, Worcestershire; *late*—Adam's Pearmain, Jonathan, Dunn's Seedling, Hoover, Strawberry Pippin, Nickajack, Rome Beauty, Buncombe, Rokewood, Winter Pearmain, Stone Pippin, Esopus Spitzenberg, and Cleopatra, if the locality suits. From these a good selection can be made. He believed in growing a good many sorts in a large orchard, because they were then more likely to get regular crops and be able to suit their customers. For export, they should pay attention to the earlier varieties, such as Reinette du Canada and Ribston Pippin. The latter was not much appreciated here, but is very suitable for the export market. Jonathan, Dunn's Seedling, Cleopatra, Strawberry Pippin, Rome Beauty, Buncombe, and London Pippin cannot be beaten for export. In regard to gathering, he would pick good and bad together and sort them when putting in the boxes, as the cracked and otherwise inferior fruit could be better picked out than in the uncertain light of the store. In picking keeping apples one cannot be too careful. Do not mix apples from a well-loaded tree with those from a tree with only a few here and there, or from a young tree, as the latter do not keep so well, and should therefore be marketed earlier. In storing them it did not matter much whether they were stacked 2ft. or 3ft. deep, as the only ones that will shrivel are those on the outside. Mr. J. Green said he would not recommend the Cleopatra, as it did not suit this district. Mr. Vickers found Stone Pippin one of the best from a market point of view.

CODLIN MOTH.—Some discussion took place on the question of the codlin moth regulations, and a resolution was carried unanimously "That the present regulations, with spraying optional, are satisfactory." Mr. Hackett said the chief danger in this district was from the fruitsheds, but if these were made close and properly sulphured the danger would be greatly reduced. Mr. Monks said cases coming from the market should be dipped. He did not think it fair to make spraying compulsory. Mr. Sharpe said he doubted whether the fumes of sulphur would destroy the larvæ in the cocoons. Mr. A. Green agreed; he noticed this season when picking their apples that where last year they found twenty fruits affected, they only had one. He strongly recommended keeping the bark clean, bandaging, and cutting broken limbs off smooth. The cases were their greatest trouble; in one with two cleats on they got twenty caterpillars, eleven out of one cleat, and nine out of the other. [Mr. S. Hannaford, Kenton Valley, tried sulphur fumes several times on boxes and bags infested with codlin moth larvæ in their cocoons, and killed them all.—GEN. SEC.]

WOOL-CLASSING.—Referring to the discussion upon the paper read at Forest Range last month, Mr. George Jeffrey writes:—"During my lecture at Forest Range on the evening of July 23rd I did not say 'that the waste pulled from the bales at the wool sales in Yorkshire is used for making shoddy.' As a matter of fact, there is no waste at the wool sales, as all the wool pulled out of bales for inspection is put back again and the bales sewn up before the wool is sent to the purchaser. I stated that a lot of the waste, during the manufacture of textile goods, was used in the shoddy trade of Yorkshire. The statement *re* the destination of our wool was too bald. I said that the bulk of our wool went to the Continent and England; but as our South and

South-East wool, in many cases, was suitable for the American buyers, who generally pay a higher price for wool than any other section of buyers, it was surprising that only 1½ per cent. of the wool sold in Adelaide last year went to that market. No doubt the carelessness in skirting, &c., was largely responsible for this, as owing to the heavy duty on wool going into America only heavily skirted and nicely got up lots attracted buyers from that country."

Dawson, August 27.

Present—Messrs. R. Renton (Chairman), J. Collins, C. W. Dowden, C. F. W. Just, C. C. Kyd, O. Muller, C. Stoneman, A. F. Dempsey (Hon. Sec.), and three visitors.

STANDARD WEIGHT OF CHAFF.—A discussion took place on this subject, and the opinion was freely expressed that legislation is necessary to regulate the sale of hay chaff, both as regards weight and quality, and a motion favoring the adoption of a standard weight of 50lbs. per bag was carried unanimously.

"SOURSOPS."—Members reported that this weed was unknown in the district, but Mr. Just stated from his experience with it elsewhere he was afraid that if once it was introduced it would spread very rapidly along the watercourses. The only way he knew to get rid of it was to keep covering it with earth.

DAIRYING.—Some discussion arose on the question of applying for the loan of one of the Jersey bull's purchased by the Government. Mr. Bowden said he preferred the Jersey breed; he had some half-bred stock now, and found they stood the hard seasons better than the larger breeds. Mr. Just said the Jersey as a dairy cow was fast displacing other breeds. The dairying industry was one of the most reliable for this district, and as they had ample proof that they could not profitably produce beef, except for their own use, there could be no doubt that the smaller cows, requiring less feed and giving richer milk, would be the best for them. The Chairman said some people preferred the Ayrshire; but his experience in the old country was that this breed was chiefly valued for cheesemaking purposes, and not for butter.

MANURES FOR MELONS—Mr. Just, in reply to inquiry, recommended well spent farmyard manure mixed with sand or loam as the best manure for melons.

Tanunda, August 4.

Present—Messrs. J. H. Walden (Chairman), A. Bietz, P. Trimmer, W. Graetz, A. B. Robin, M. T. Ellis, G. Mann, C. Heinemann, A. Ohlmeyer, and E. Trimmer (Hon. Sec.).

GRAFTING.—Members were of opinion that when a graft on a vine fails to take it is better to cut the stem back a little and regraft rather than to graft on to a sucker. Mr. Robin said the loquat could be grafted or budded on quinces, and thrived well. January and February were best months for budding, and March for grafting.

KEEPING ONIONS AND POTATOES.—The Chairman said he had tried to keep potatoes by storing them in a tin-lined box and covering them with sand, but the sand must have been damp, as the potatoes started to grow. The Hon. Secretary asked whether onions could be kept in this way, but none of the members had tried it. James' Long Keeper was considered the best for keeping.

PAPERS.—It was decided to draw lots at each meeting to decide which member should prepare a paper for the following meeting, no member to be called on for a second paper before each of the others has contributed one.

Auburn, August 25.

Present—Messrs. W. R. Klau (Chairman), J. B. Schober, E. M. Dudley, G. R. Lambert, J. Hean, and Dr. J. W. Yeatman (Hon. Sec.).

WEEDS.—Members stated that the weed “soursops” had been spreading in the district for many years, but no measures had been taken to destroy it. The Chairman tabled a weed with leaves resembling rib grass, with tough deep roots spreading underground, a fresh plant springing up from each node. Mr. Lambert said he had succeeded in killing a dense growth of couchgrass by putting in a crop of mustard and allowing it to go to seed, but the weed tabled by the Chairman could not be combated in this way.

Lyndoch, August 25.

Present—Messrs. H. Kennedy (Chairman), S. Sage, J. M. Sim, W. McIntyre, R. Ross, W. J. Springbett, and J. Mitchell (Hon. Sec.).

“SOUSOPS.”—Members reported this weed to be very prevalent. Early ploughing and scarifying two or three times during spring has been found to act as a preventive to its spread.

SUMMER FODDERS.—A good discussion on this subject took place, the following conclusions being arrived at:—The ground must be well ploughed (fallowed) and seed ploughed in about 4in. deep. *Holcus* is the best all-round summer fodder, and should be sown about middle of September to early in October, according to liability to frost. *Lucern* is valuable for summer feeding, but must be allowed to wilt for three or four hours before giving it to the cows.

WASTE TOBACCO.—Members wished to know whether tobacco waste can be obtained through the Central Bureau. [No. It is on sale at the Public Stores Department, Port Adelaide.—GEN. SEC.]

Hartley, August 26.

Present—Messrs. W. Klenke (Chairman), A. Thiele, H. Reimers, J. Jaensch, A. McDonald, W. Kutzer, W. Stanton, and H. Lehmann (Hon. Sec.).

STANDARD WEIGHT OF CHAFF.—Considerable discussion on this subject took place, members favoring 40lbs. per bag. The members were of opinion that a distinction should be made in selling hay chaff and header chaff, as the former was worth much more than the latter. It was stated that the price of good hay had been brought down by the sale of inferior headed hay.

“SOUSOPS.”—This weed was reported to be prevalent on the banks of the Bremer, but had not spread on the clay lands. It was found very injurious in the wheat crops.

Willunga, August 13.

Present—Messrs. W. J. Blacker, (Chairman), James Valentine, A. Slade, John Binney, W. J. Binney, J. A. Jacobs, T. Pengilly, R. Russell, J. Hockney, and C. Bray (Hon. Sec.).

BLACK SPOT OF POTATOES.—Mr. Jacobs reported that the portion of his potato crop sprayed with Bordeaux mixture was quite free from this disease, while the portion untreated was badly affected.

DISEASE OF FOWLS.—Mr. W. J. Binney reported that his fowls were suffering from bad eyes. The lids became red and swollen, causing blindness, while matter continually oozes from the eyes. [Mr. D. F. Laurie states this is probably roup, and advises the following treatment:—Wash the eyes with solution

of sulphate of copper or permanganate of potash, and give three times a day a pill about size of a small marble of a mixture of $\frac{1}{2}$ oz. liquorice powder, $\frac{1}{2}$ oz. ground ginger, $\frac{1}{2}$ oz. cayenne, $\frac{1}{2}$ oz. pimento, 1oz. Epsom salts, 1oz. confection of senna, with sufficient treacle to make a stiff paste.—GEN. SEC.]

BOILS.—Mr. Jacobs stated that during the past twelve months his mare had frequently suffered from boils under the back, just beneath the saddle. He had tried dry and green feeding, but it seemed to make no difference.

MANURING—A long and interesting discussion on this subject took place, each member giving his experience on the subject, and it was resolved that, in the opinion of this Branch, regular and systematic manuring will pay, resulting in increased crops and the land in better heart.

Mount Remarkable, August 25.

Present—Messrs. H. B. Ewens (Chairman), A. Mitchell, S. Challenger, W. Girdham, T. P. Yates, W. Lang, C. E. Jorgensen, T. H. Casley (Hon. Sec.), and one visitor.

"SOTRSOPS."—Members stated this weed was introduced some years ago by a person who attempted to make a beverage from it, and it is now spreading rapidly. Digging it up, chopping off the tops, burning leaves or straw on affected patches, and covering with bagging, have all been tried without avail.

MANURES.—Mr. Mitchell read a paper on this subject.

EXHIBITS.—Mr. Girdham tabled good specimen of Yellow Tankard turnip, and Mr. Lange showed specimen of wheat affected by some disease.

INDUSTRY.

Supplied by the Department of Industry (C. C. Cornish, Secretary).

State of the Labor Market.

BUILDING TRADES.—At present most of the branches of these trades are in full work, except painters and plumbers. In the city and suburbs dozens of well-designed and comfortable villas are being erected, and every year the buildings are more artistic in appearance, and home comforts are provided for the occupants in the form of wardrobes, gasfittings, stoves, cupboards, kitchen ranges, with proper baths and sanitary conveniences.

The erection of the new Picture Gallery on North terrace, Adelaide, is being rapidly pushed on, and the foundation stone of the Conservatorium of Music, Adelaide University, is to be laid shortly. The huge granite foundations of the Mutual Buildings, King William street, are being put in their places, whilst a large warehouse in Grenfell street is nearly ready for the roof. The walls of the Congregational Church at Unley are up, and the Anglican Church at Hawthorn is nearly finished. Numbers of new shops are being erected in the city and suburban townships.

ENGINEERING, IRON, &c.—Good work has been done in mining machinery for Western Australia and Broken Hill, and numbers of men have found work. A large (marine type) boiler for the *Advertiser* newspaper department has been finished by a leading city firm. The manufacture of locomotive engines, mining machinery, and agricultural machinery, continues to keep the Gawler mechanics employed. At Gawler South the foundry and engineering works are manufacturing winding plants for Western Australia, smelting requisites for Port Pirie, slag pots for Cockle's Creek (New South Wales), steel mining trucks for Westralia, concentrating plants for International Copper Company of

London and New Caledonia, smelting and refining plant for Wallaroo. These works and the branch at Port Pirie give employment to about 230 hands, working night and day, at Gawler. At the Limited Company Engineering Works 700 men are fully employed on locomotive, mining, and other machines. The prospect of an abundant harvest will give an impetus for the manufacture of harvesting machinery.

LAYING NEW MAINS.—The Semaphore Water Supply work, which has given employment to a number of men, is completed. The Public Works Department will engage most of the men for the extension of the drainage area, and on the new waterworks at Bundaleer.

NEW RAILWAY STATION.—A number of men are engaged in pulling down the old goods shed and workshops, and immediately the ground is cleared the erection of a new station will be commenced. The increasing railway traffic will then be worked from several platforms, as is the custom in the other colonies. Increased accommodation will be provided for passengers, and cabs will be able to take and receive their luggage from the platforms. The entrance for vehicles will be from the King William road, between the Government Printing Office and the City Baths.

SHEARING—Work is now in full swing in a number of the North-Eastern sheds, affording work to some hundreds of men—skilled shearers, woolclassers, pressers, rouseabouts, cooks, teamsters, and others. The wool sales will be held shortly, and it is stated in the London and Australian press that an advance in price of all merino wools will take place. Buyers are arriving from Europe to attend the wool sales in Australia.

NON-SKILLED LABOR.—A great many men are employed in gardening and odd jobs, attending to lawns, and planting out orange and lemon trees, &c.

FACTORIES.—Work has continued brisk in most factories. The Government have established a Factories Department independent of the Health Department. Inspector Bannigan will devote the whole of his time to the factory work. He will be assisted by Mrs. Inspector Milne, and a clerk will be in constant attendance at the new offices, which are situated in the Police Court buildings, Victoria square, Adelaide, to which office all correspondence, notices for working overtime, and registration notices should be sent.

Labor Bureau.

The Department of Industry has prepared regulations for establishing a Labor Bureau for the purpose of facilitating the engagement of labor. These regulations will be published in the *Gazette* at an early date.

Noisy Trades Bill.

Recently a wood merchant of Norwood was ordered to pay damages to an adjacent occupier of a dwelling-house for the noise made by the sawing necessary in his trade, and the wood merchants interested, together with the corporation of Norwood and Kensington, obtained a promise from the Premier to support a Bill dealing with the subject, and a measure has been prepared, which will be in charge of the members for East Torrens, for introduction in the Assembly. "Noisy trades" include those of wood-cutting and boiler-making, and any trades that may be so declared by proclamation. The Bill gives municipal corporations and district councils power to frame by-laws for the prevention of noisy trades being carried on except by licensed persons, for the regulation of these businesses with a view to the prevention of annoyance to

neighboring residents, and for the inspection of the premises whereon such trades are conducted. A licence is not required for the carrying on of any of the specified works when they are conducted at a distance of more than 200yds. from the nearest dwelling-house, or within any less distance which may be fixed by by-law, and those so carried on are not deemed a nuisance, and the persons concerned are not subjected to civil or criminal proceedings.

Gold Mining.

PAYABLE CEMENT IN BAROSSA.—Mr. H. Y. L. Brown, the Government Geologist, recently reported that he thought the cement beds on Crown Lands at Goddard's Hill, Barossa Diggings, were worth testing. The Minister of Lands, Hon. L. O'Loughlin, ordered that 24 tons of the cement should be treated at the Mount Torrens battery, and the return gave a total result by battery and cyanide of 11ozs. 14dwts. of gold. Mr. Brown reported:—"This return should be highly payable if the cement were treated locally, as there are thousands of tons of similar material likely to be auriferous available in the locality." The object of the Minister in ordering the test was to demonstrate to the Barossa Gold Mining Company and others that there was payable stone to be obtained, if treated locally, as the trial at Mount Torrens shows a profit after paying for cartage a distance of 30 miles. The cement beds are within a mile of the Menzie's Barossa battery. (So far reported in *Advertiser*.) The above discovery will afford employment to numbers of miners, engineers, and others, and Gawlerites will be rewarded for their pluck and energy in erecting the powerful machinery at Menzie's Barossa. It is now nearly thirty years since gold was discovered in the ranges ten miles east of Gawler. There is no doubt that these quartz reefs and cement beds extend a considerable distance north-east and east of Gawler and the Barossa Ranges.

GOOD NEWS FOR MINERS AND SURFACE-MEN.—A discovery of flux has been made to the west of Port Augusta, and notification of intention to apply for leases advertised. Owing to the increased price of copper a number of prospecting parties are now out searching for minerals. Favorable returns are being procured in the neighborhood of Leigh's Creek. Men are earning good wages, and the transit of the ore to the smelters is facilitated by the proximity of the Great Northern Railway.

Port Pirie.

THE BROKEN HILL MINES.—The whole of the new furnace plant, consisting of eight large (120 tons) and three small (80 tons) smelters, is now in operation at Port Pirie. The refinery plant is nearly complete. When finished, the company will be able to deal with 1,000 tons of bullion per week. A great increase to the population of this rising seaport has been caused by the transfer of the smelters to South Australia from New South Wales.

Immigration Prohibition.

The Government have, in compliance with the decision arrived at by the Premiers of Australia, introduced the Immigration Prohibition Bill on the lines of the Natal Act.

The Government have also given notice to all steamship companies trading to the East of their intention to introduce the measure, and intimated that the provisions of the Act will be strictly enforced.

CHINESE IMMIGRATION.—In consequence of the strictness which the authorities of Victoria have carried out the law relating to the importation of Chinese and the action of the steamship companies engaged in the China trade the immigration of Celestials has almost ceased, and for a period of over four weeks no oversea Chinese passenger has presented his credentials at Melbourne.

JAPANESE.—One hundred Japanese have arrived at Port Douglas, Queensland, per steamer *Yamashiro Maru*. These people are to work in the sugar plantations with the Chinese and Kanaka laborers.

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AND

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NOTES AND COMMENTS.

The agricultural statistics for 1897-8 harvest contain a few items of special interest. The amount cut for hay shows an increase of about 75 per cent. over the previous year, the area cut showing an increase of 110,000 acres. This increase was probably due to the hot dry weather of last November causing the farmers to cut considerable areas which would otherwise have been left for grain, and with the plentiful supply of herbage this year will account for the very low price of hay just now. The figures concerning ensilage are very disappointing. Five years ago there were 300 pits in use, with a capacity of 369,903 cub. ft.; last year there were only seventy-three pits, aggregating 74,476 cub. ft. This is of course partly due to the absence of raw material last season, but owing to mistakes in the past and to the extra labor there is unfortunately no doubt that most of our dairymen look with suspicion on this form of fodder conservation.

Purchasers of Thomas phosphate or basic slag should see that in addition to the guaranteed analysis the sellers guarantee the degree of fineness to which it is ground. As the phosphate of lime in this fertiliser is very insoluble, it is imperative that, to get good results from its use, it must be ground to an impalpable powder. First-class Thomas phosphate should contain at least 17 per cent. of phosphoric acid, and should be ground fine enough to pass through a sieve containing 10,000 meshes to the square inch. By the provisions of the Fertilisers Act it is compulsory upon vendors of fertilisers to attach to every bag or parcel a statement showing the percentage of phosphoric acid, potash, and nitrogen contained in their various combinations.

In order to encourage farmers to improve the breed of the dairy cattle of the colony the Department of Agriculture has just purchased one Holstein, two Ayrshire, and five Jersey bulls. These animals have been selected by Mr. Alex. Murray, of Mount Crawford, with the special view to their being suitable bulls to mate with our common cattle for the purposes of obtaining stock of improved milking qualities. The Holstein has been sent to Millicent, one Ayrshire to Petersburg, and another to Robertstown, while the Jerseys are stationed at Gladstone, Koolunga, Quorn, Mount Pleasant, and Gawler River. The bulls purchased last year will probably be shifted from their present stations about the end of January.

Some of our factory managers assert that butter made from pasteurised milk or cream is inferior in aroma and quality to butter made in the ordinary way. Reports from the Euroa Factory, Victoria, show that a better price was obtained from pasteurised butter, and that so satisfactory has the result been that every ounce of cream from their six creameries was last year pasteurised. The Danes go in very largely for this practice, and of nearly 700 factories entering for the butter tests last year less than 2 per cent. made butter from unpasteurised cream or milk.

Early in September myriads of small beetles were noticeable in the Warrnambool (Victoria) district, and were supposed to be the perfect insect of the small underground grub, allied to the common cockchafer, which has done so much damage to the crops and grass this year. The beetles seem to have made their appearance much earlier than usual, and it behoves our farmers to keep a sharp lookout for them and destroy as many as possible, as it is only at this stage that anything practicable can be done to prevent injury by the grubs which will be produced later on as the progeny of the present beetles.

A number of apple-growers in codlin moth infested districts leave the bandages on the trees right through the winter. This simply means that they provide the best shelter possible for their worst enemy. The bandages should all be removed, the rough bark scraped off, and every shelter for the caterpillars removed before the beginning of September. Where this work has not been done, steps should be at once taken to remedy the oversight. Growers should bear in mind that every caterpillar that escapes destruction means the loss of many pounds of fruit during the coming season. There is no excuse for ignorance upon this subject, because within the infested districts nearly every owner of trees likely to be attacked by codlin moth has been furnished with printed directions as to what is requisite to combat the pest and what he is required to do under the provisions of the Act.

Experiments conducted at the Nebraska Experiment Station appear to show that the eggs of codlin moth can be prevented hatching and the newly-hatched larvæ destroyed by kerosene emulsion. These experiments were of course conducted in the laboratory, but in view of the great advantage it would be if this pest could be dealt with before it begins to eat, it would be well for some of our growers to carefully test the matter. The eggs of the codlin moth appear to be generally laid on the upper surfaces of the leaves and on the young fruit, so that it would be necessary to thoroughly spray the whole of the foliage. The trees should be sprayed about a fortnight after the petals of the flowers have dropped, and the operation repeated a fortnight later.

Mr. A. M. Lea, of the West Australian Department of Agriculture, reports that the San Jose scale (*Aspidiotus perniciosus*) exists in four different localities in that colony. It appears, therefore, that South Australia is at present the only colony known to be free from this dreaded pest, and for this reason it is imperative that the regulations regarding the introduction of plants from the adjacent colonies should be strictly enforced in the interests of our fruit-growers.

By proclamation in the *Victorian Government Gazette* the scale insects *Mytilaspis citricola* (lemon mussel scale) and *Chionaspis citri* (white scale of orange), and the parasitic fungus *Melanose* (affecting citrus fruits) are declared to be insects and a fungus respectively within the meaning of the *Vegetation Diseases Act, 1896*.

By proclamation in the *New Zealand Gazette* of August 18th, 1898, the ports of Auckland and Wellington are declared to be the only ports open for the introduction of any plants or portions of plants (except the fruit thereof); and it is also absolutely prohibited to introduce any plant or portion of a plant which is infected or bears any trace of having been infected with any species of scale insect.

At Willunga the crops of White Elephant potato are affected by some fungus disease, causing yellow blotches, which change to dark brown with age, and considerably enlarge in size. This fungus has not yet been determined, but growers in the locality would do well to spray their young crops with Bordeaux mixture before any signs of the disease shows. So far the only variety attacked by this disease is the White Elephant.

A new digging machine, worked by traction engines, has lately been brought under notice in England. It is patented by Messrs T. A. & S. C. Darby. It is triangular, supported on a single roller, adapted to rise or fall according to inequalities of the soil. The digging is performed by ten two-pronged forks fixed along two sides of the triangle, rotated at considerable speed, and effectually break up the ground to a width of 11½ ft., and any depth from 2 in. to 10 in.

The Americans have cultivated maize ever since the first days of settlement, but they are still discovering improved methods of cultivation. They have only within the last few years found that "hilling-up" is a mistake, that "suckering" and "tasselling" are not beneficial, and *deep* hoeing or "cultivation" decidedly lessens the yields of "corn" and of fodder. Frequent cultivation to a depth of not more than 3 in. results in a considerable increase both of grain and fodder. Anything that injures the roots will injuriously affect the yields of "stover" and of maize.

A great number of experiments have been conducted in Nebraska, U.S.A., with a view to ascertain the effects of subsoiling upon the yield of maize crops. Almost invariably it was found that where clay subsoil existed the subsoiling was beneficial for several seasons; but subsoiling where the subsoil was of a loamy nature usually showed no beneficial results, and often proved to be injurious in regard to the yield of maize. On clay subsoils 80 per cent. subsoiled gave favorable results, and on loam subsoil only 23 per cent. were favorable.

In Sydney several fresh inspectors have been appointed to attend the slaughter-houses with the object of preventing the sale or consumption of diseased meat. All meat is carefully examined and, if found healthy, is branded in several places, but not so as to spoil its appearance. The fact that bovine tuberculosis and some other diseases which are communicable to mankind have been discovered in dairy cows and other cattle in the Australasian colonies is sufficient

justification for the adoption of stringent measures to prevent the spread of those diseases, and, so far as possible, to stamp them out; and when we are able to state that our dairy herds are altogether free from disease our dairy products will command a position in the British markets considerably higher than can be hoped for by Continental dairymen, whose climatic surroundings render it almost impossible to secure immunity from tubercular and other dangerous diseases.

The field poppy is becoming seriously prevalent in many parts of the colony. A very few years ago it was quite a rare plant, but now the fields of wheat and hay in many places are quite brilliant with its flowers. As the seeds are exceedingly abundant, and will retain their vitality for many years when turned under by the plough, it is likely to be a serious pest in the near future. Farmers should at once use every effort to cleanse their fields, and be very careful not to plough the seeds under.

WHERE TO BRAND.

A recent transaction in hides is worthy of attention because of its bearing on the subject of the branding of cattle. The parcel of hides was from bullocks bred by Messrs. McCrea Bros., of Werai Station, New South Wales. The hides were of only average weights and thickness, but at Messrs. Younghusband and Co.'s auction sale, held on September 17th, they realised 4½d. per lb., this being in excess of the current value of similar hides by fully ¾d. per lb., or 18 per cent. The purchasers were Messrs. J. Kennon & Sons, of Richmond, and the reason why such a price was given was that the hides were branded on the neck, close behind the ear, instead of on the rump, as is only too common. The parcel of hides is to be used in the manufacture of leather by the recently introduced chrome process. Glancing over a number of specimens of manufactured leather, the reason for the preference given to hides marked on the neck is obvious.

Coachbuilders have to cut the leather square, and if the rump has a brand they have to start cutting at a considerably greater distance from the tail end, in order to avoid the brand, so that a large slice of that end of the leather is lost. If, on the other hand, the brand is on the neck there is a double advantage, because the part to be cut off at the neck end is of much less breadth than at the rump end, and because the neck end is the least valuable part, the rump end being the most valuable.

In the case of bootmakers' sides, those which carry the brand on the rump have to be sold as seconds, and the value of the whole side is depreciated by 1d. per foot, because of the brand in the corner where some of the most valuable part of the leather is situated. Such is the custom of the trade, and it cannot be expected that the buyers of leather will consent to an alteration so long as the system of branding on the rump continues. Amongst the hides at present in Messrs. Kennon & Sons tanning pit is that of the monster prize ox recently shown, but this, unfortunately, carries a brand where it is not wanted, namely, on the rump. There can be no doubt that the most effective manner in which to check the practice of branding—and, it may be added, the practice of cutting the skin with butchers' knives in flaying the carcass—is by making a difference in the prices at which the tanners make their purchases. Let it be known that the hides of cattle branded on the neck, instead of on the rump, will realise 2s. 6d. to 3s. per head more, and there will be an inducement to stockowners to adopt the better plan.—*Australasian*.

AGRICULTURAL BUREAU CONGRESS.

The Tenth Annual Congress of the Agricultural Bureau was held in Adelaide on Wednesday, Thursday, and Friday, September 7th, 8th, and 9th respectively. Mr. F. E. H. W. Krichauff, Chairman of the Central Bureau, presided over the meetings.

The following members of the Bureau attended one or more sessions:—
 Central Bureau: Messrs. F. E. H. W. Krichauff, S. Goode, W. C. Grasby, Professor Lowrie, H. Kelly, J. Miller, M.P., T. Price, M.P., Professor Perkins, Hon. A. W. Sandford, M.L.C., C. J. Valentine, and A. Molineux (secretary).
 Albert: Messrs. H. L. Smith and H. Lane. Angaston: Messrs. J. E. Swann and F. Salter. Appila-Yarrowie: Messrs. C. G. F. Bauer, J. Wilsdon, W. Stacey, P. Lawson, and C. W. H. Hirsch. Arden Vale: Mr. M. Searle. Arthurton: Mr. W. H. Hawke. Balaklava: Mr. W. H. Sires. Baroota Whim: Mr. F. H. Flugge. Belair: Mr. G. R. Laffer. Bowhill: Messrs. W. G. F. Plummer, J. G. Whitfield, C. Dragomuller, and E. Smith. Brinkworth: Messrs. R. Cooper, J. F. Everett, and J. Stott. Burra: Hon. J. Lewis, M.L.C., and Mr. F. A. S. Field. Bute: Mr. A. Schroeter. Carrieton: Mr. W. H. Byerlee. Cherry Gardens: Messrs. J. Jacobs, C. Ricks, and R. Gibbins. Clare: Mr. W. Kimber. Clarendon: Messrs. A. L. Morphet, W. A. Morphet, A. Harper, and J. Wright. Cradock: Mr. J. Clarke. Crystal Brook: Mr. W. J. Venning. Dawson: Messrs. A. F. Dempsey and O. Müller. Dowlingville: Mr. T. Kenny. Elbow Hill: Messrs. G. Wheeler and H. Dunn. Eudunda: Messrs. J. von Bertouch and A. M. Twartz. Finnis: Mr. T. Collett. Forest Range: Messrs. J. Vickers and R. M. Hackett. Gawler River: Mr. A. M. Dawkins. Gladstone: Messrs. E. Coc and J. Brayley. Gumeracha: Mr. W. Cornish. Hahndorf: Mr. F. H. Sonnemann. Hartley: Mr. H. Reimers. Hawker: Mr. A. C. Hirsch. Holder: Mr. F. A. Grant. Inkerman: Messrs. S. Diprose, W. Board, and J. Sampson. Johnburgh: Messrs. G. H. Dunn and T. A. Thomas. Kanmantoo: Messrs. J. Hair, A. Hair, and J. Downing. Kapunda: Messrs. H. T. Morris, G. Teagle, and T. Jeffs. Koolunga: Mr. T. B. Butcher. Lucindale: Messrs. E. Feuerherdt, E. Hall, and G. C. Newman. Mailand: Mr. J. Pitcher. Mannum: Mr. Harry Brown. Meadows: Mr. W. J. Stone. Millicent: Messrs. R. Campbell, A. McRostie and H. A. Stewart. Minlaton: Messrs. James Correll and D. G. Teichelmann. Morgun: Mr. J. Wishart. Mount Bryan East: Mr. H. Wilkins. Mount Compass: Mr. H. McKinlay. Mount Gambier: Messrs. J. C. Ruwoldt, J. Watson, and J. Umpherston. Mount Pleasant: Mr. G. Phillis. Mount Remarkable: Mr. A. Mitchell. Murray Bridge: Mr. W. Lehman. Mundoorra: Mr. R. Harris. Nantawarra: Messrs. C. Belling and J. W. Dall. Naracoorte: Messrs. D. McInnes and S. Schinekel. Narridy: Mr. W. J. Martin. Norton's Summit: Messrs. J. Jennings and W. Merchant. Orroroo: Messrs. W. S. Lilicrapp and J. Jamieson. Penola: Dr. F. Ockley. Petersburg: Messrs. J. Wilson, T. Selby, and F. W. Sambell. Pine Forest: Mr. D. F. Kennedy. Port Broughton: Messrs. R. W. Bawden and H. H. Whittle. Port Elliot: Messrs. J. Brown, C. H. Hussey, P. O. Hutchinson, E. J. Hill, and W. E. Hargreaves. Port Germein: Messrs. H. Gluyas, E. McHugh, and W. Broadbear. Port Pirie: Messrs. F. R. Humphries, H. B. Welch, and P. J. Spain. Quorn: Messrs. R. Thompson and A. F. Noll. Redhill: Mr. G. Wheaton. Riverton: Messrs. H. A. Davis, M. Badman, and D. Kirk. Stansbury: Messrs. P. Anderson, G. Sherriff, and James Sherriff. Stockport: Messrs. C. W. Smith and D. G. Stribling. Strathalbyn: Messrs. M. Rankine and W. J. Tucker. Swan Reach: Messrs. P. Beck, J. O. J. Kohnke, and F. F. Brecht. Tanunda:

Mr. A. B. Robin. Tatiara: Messrs. W. Montague, E. Prescott, C. H. Wiese, and G. Ferguson. Willunga: Messrs. W. Blacker, M P., and J. Allen. Wilmington: Mr. A. Maslin. Woodside: Messrs. F. D. Heidrich and R. W. Kleinschmidt. Woolundunga: Messrs. H. Aldenhaven, J. Michael, N. Rogers, and T. H. Prosser. Yankalilla: Mr. G. Newbold. Yorketown Messrs. J. Davey and J. Latty.

The Opening Address.

THE MINISTER OF EDUCATION AND AGRICULTURE (Hon. Richard Butler), in delivering the opening address, said:—Mr. Chairman and Gentlemen—I have occupied many positions since I took office as Minister of Agriculture a few months since, but nothing gives me greater satisfaction than to have the opportunity of addressing my brother farmers at this your Tenth Annual Congress. It falls to my lot, as Minister for the time being, to open this Congress—and it is a pleasing duty I hope will frequently recur as the years roll round—and to say a few words to you of encouragement and hope. I do not think that the three or four bad years we have gone through will have done us very much harm; rather should I say, “Sweet are the uses of adversity,” and from my knowledge of the country I do not think the prospects were ever brighter than they are at present for a good harvest and a good grass season. (Hear, hear.) The Department of Agriculture is a much more live department than it was a few years ago. The Government—and I believe with the approval of the Bureau—have been stepping out in the right direction. In the opinion of some people it is thought we had better let things alone. I was always a warm supporter of the different branches of industry of agriculture which the Government are assisting to develop, and since I have been occupying the position of Minister of Agriculture I am more than ever convinced that what we are doing will be for the advantage of the producers of South Australia. (Cheers.) I know that we have some adverse critics. Some people say we are interfering with private enterprise, but I think that I shall prove before I sit down that what we are doing stimulates private enterprise, and that Government assistance in the long run makes things very much better for those who are raising wealth from the soil. I recognise that the Agricultural Bureau, with its hundred Branches scattered over the colony, is doing work which it is exceedingly difficult to overvalue, and doing it for the love of it. Unlike the Parliament on North terrace, I should like to see the numbers increase. There can be no disputing the fact that the interchange of ideas, the discussion of questions in which we are all interested, the comparison of notes in connection with the experiments which we are trying throughout the country in order to improve the condition of the agriculturists, must eventually be beneficial, not only to those engaged in the cultivation of the soil, but also of great advantage to the community as a whole. I know that the farmer's life has not always been a most attractive one, and some foolish people have imagined that the less a farmer knew in book-learning the better he would get on with his work. I think that those ideas are being very rapidly dispelled. It is felt that the agriculturist to-day should be a man with a diversity of gifts, and having a knowledge of a great variety of questions, which must interest him in, and assist him also to carry on, his work. We know that machinery is taking the place of hand labor to a great extent, and we know that in connection with our dairy industry we have to adopt new methods if we are going to compete with the markets of the world. In connection with stock, as well, we have to very materially improve the breed if we wish to successfully compete in the home markets in the export of sheep and lambs. What the Bureaus are trying to do (and the Government and Parliament are anxious to assist them in doing it) is to make agriculture

more profitable, and I have very strong hopes—speaking as an agriculturist myself—that we are now on the dawn of better times. (Cheers.) We now know pretty well the limit to which agriculture can be successfully carried on, and the policy for the future must be to concentrate our efforts on the lands on which there is known to be a fairly reliable rainfall, without extending the area where, in most seasons, settlement must end in disaster. (Cheers.) I prophesy we shall see in the near future, on, say, a farm of 1,000 acres, that instead of a man planting 600 or 700 acres he will put in probably a third of the ground and work his land to a much greater extent than in the past—(hear, hear)—and will do something to restore fertility by means of fertilisers, the profitable use of which has been more and more demonstrated, and on the land not under crop a much larger number of stock can be carried. With the object of encouraging the use of fertilisers and protecting the purchasers I have had the pleasure of carrying through the House of Assembly a Bill dealing with fertilisers. If you look at the *Age* of a day or two ago you will see that the Act passed in Victoria has defects exactly as our own Act, which we are seeking to amend, and at a meeting of farmers held quite recently in Melbourne they suggested the very same amendments which we have adopted in the House of Assembly, and which I feel sure will be carried in the Legislative Council. (Hear, hear.) First of all, we know that a very large quantity of fertilisers was sold last year without any analysis being supplied to the purchaser. We are bringing guano under the Act too. We appoint inspectors to take samples from the persons who deal in the fertilisers. These samples are analysed by the Government Analyst, and the result of the analysis and the approximate value which the fertilisers give to the manure are advertised in the *Journal of Agriculture*, and in any other papers which the Minister thinks necessary, together with the price which the agents or importers are asking for the manure. I think you will agree with me that this is a step in the right direction. (Cheers.) We are told that we cannot get at the commercial value. I can show you publications issued by the departments of agriculture New South Wales and Victoria where they do exactly the same thing. It does not attempt to fix the prices at which men are to sell their articles; but those who were doing an honest trade will not be injured, but rather assisted, while those who are living in the country a long way from the city will have the opportunity of looking through the prices of the agents at which the fertilisers can be obtained and seeing the value as ascertained by analysis. Then I would like to say a word or two about another department in which the farmers of South Australia—and by farmers I mean agriculturists, dairy-men, fruitgrowers, viticulturists, and others—are interested. I refer to the Export Department. Some of our people take exception to the management of the Produce Export Department, contending that it has not yet made the two ends balance, but they altogether ignore the fact that there have been unprecedented droughts which have had a very serious effect upon the department which aims to find markets for our by-products. Last year the balance was only £700 on the wrong side after paying the engineer and laborers at Port Adelaide and all office expenses as well; and when I tell you that we shipped nearly 600 tons of butter three years ago, and owing to nothing but drought imported something like 300 tons during 1897, instead of exporting, you will see the effect on one line alone. It is not fair to say that because this department does not show a direct return it is not of advantage to the people and the taxpayers of South Australia. Take the rabbit industry for instance. In order to encourage the turning to a profitable use of animals which are only a scourge at present, Dr. Cockburn, when Minister of Agriculture, fixed the charges at our dépôt for freezing and shipping rabbits at the same prices as the Melbourne, where they have an immense number of animals to deal with, where of course

the supply is continuous, and where consequently the work can be done more cheaply than we can where the supply is intermittent and, owing to longer railway carriage, the rabbits do not reach the department in as good a condition. I find the present manager of the dépôt, Mr. Skevington, most anxious to further the interests of the department, and every producer who knows him will be impressed with his desire to serve the department well. As regards rabbits, we lost about £400 directly through the treatment of the animals; but we paid the Railway Department alone between £800 and £900 for the carriage of rabbits from Mount Gambier, and we have paid over £500 for the making of crates. We shipped between £4,000 and £5,000 worth of rabbits last financial year, which, if they had not been dealt with, would be running over some of our best lands in the South-East and eating feed now used for sheep. (Cheers). If next year's supply is larger and more continuous I think we shall be able to run that branch of our industry without very much direct loss to the department. In Melbourne they have the advantage of getting supplies of rabbits close to the city. A few hours after the rabbits have been caught they are in the dépôt. Here there is a delay of two or three days before they are treated, resulting in deterioration. The supply being intermittent and the condition irregular places us at a disadvantage. As regards the wine industry, the London dépôt has not paid its way directly, but the money we are spending in advertising our wines will result in great advantage to everyone in South Australia. Victoria spends £10 to our £1 in pushing her wine trade. In 1896-7 we exported 391,233galls. of wine, in 1897-8 we exported 513,827galls., or an increase of 120,000galls. in one year; while Victoria in 1896-7 exported 351,361galls., which went down in 1897-8 to 323,136galls., so that our policy in having Mr. Young in England, and judiciously advertising our wines there to show that we are adopting a better policy than that which has been adopted in Victoria, of spending the money in the colony. Last year we shipped from the dépôt at Port Adelaide 139,000galls., against 43,000galls. the year before, so that it will be seen that in this industry, which has not been affected so much by the drought, we are increasing our work. The lamb trade has also been a great success as far as the prices went. Only 3,000 lambs were shipped through the dépôt last year. One lot shipped by Mr. Harkness, of Owen, through Elder, Smith, & Co., netted the owner 14s. 9d. each. They were pretty heavy lambs—about 44lbs.—and they realised 5½d. per pound in London. Mr. Harkness told me that he has sold lambs in the Adelaide market, of equal quality, for 4s. and 5s. (Cheers). The whole of the colonies will very soon be self-supporting as far as the natural products are concerned, and we have to look to the markets of the old world for taking the produce which we can produce in South Australia and do not want for home consumption. As far as the quality of our production is concerned no colony of the Australasian group will beat us. (Cheers). Only this week a breeder wished me to take 2,000 lambs at the dépôt in the next fortnight. We have orders coming in faster than we can take them, and I believe that this year we shall ship four times as much as ever before, in spite of the drought. I have heard some people say that the dépôt benefits only those who ship the produce, but it benefits the whole of the community, and especially those who sell the produce in South Australia. Our consumption is small, and we must find markets elsewhere if we wish to carry on this industry successfully. It is the same with the butter industry. Before we adopted the butter bonus we used to have to sell butter at 3d. or 4d. per lb. Farmers said that that would not pay. We had prices varying from 2s. 6d. down to 4d., but with a regular export trade established, and with valuable assistance which our farmers are going to receive from our present dairy instructor, Mr. Thomson (Applause)—a young man, certainly, but I think we can get more

work out of the young men than the old—we shall derive great benefit from our export depôt. I am exceedingly glad to know that the shareholders in the factories of South Australia are appreciating the work which Mr. Thomson is doing. He is a man who has the courage of his opinions, and does not come to South Australia pretending that he knows everything straight off. (Hear, hear.) He is endeavoring to grapple with South Australian conditions. We do not want a man who is all theory and no practice. We want a man who is able to combine the two, as Mr. Thomson has done. (Applause.) As with our State Bank—I do not know whether that is popular here—we fix a maximum rate of interest, which, if other financial institutions desire to do business with our producers they must keep within; so with our Export Department, we fix a minimum, and if the price does not come up to that, our producers can ship to Europe. A Victorian farmer told me the other day that the State Bank is one of the best institutions the colony has, because of its beneficial influence on other financial institutions, and the same thing applies to the Export Department, which compels other exporters to do their very best for the producers. (Applause.) I believe that better times are in store for South Australia, and that by the help of agricultural education we shall build up a class of men who will avoid some of the mistakes their fathers have made, and will look a little further ahead. In a climate like ours when we get good seasons we should endeavor to provide for the bad ones which come after. (Hear, hear.) We see thousands of tons of stuff which costs us nothing to raise from the soil ploughed into the ground, or burned, or wasted, instead of being by a little labor stacked and made into ensilage. You will see that our dairying industry will never grow to the extent it ought unless we can maintain a large supply of feed all the year round, and especially at a time when the prices for produce are best. I would like to tell you how very satisfactory the shipment of apples through the Agricultural Department was this year. We are not anxious that the Department should do business at both ends when any of our producers think that their own agents in England can do it better for them, and while I thought I was fairly liberal in issuing the circular which was sent out through the country in connection with the Department, stating that we are prepared to advance money on produce and charge 5 per cent. interest in addition to advancing freight and charges, I thought we were working on business lines in offering such terms. (Hear, hear.) I was delighted last week when I took up Elder, Smith & Co.'s circular and found that they were offering to lend the producers money without interest at all. (Cheers.) Is that an interference with our private enterprise? Is it hurting the farmers? (Applause.) If the effect of the Government stepping in and establishing our Export Department makes merchants in the colony say that they will go on better and not charge interest at all, then I say the farmers ought to recognise who are their friends. (Applause.) I will read to you particulars of the apple shipments. I think we are going to have a large apple crop this year. I have always found that after the trees had a rest a large crop may be expected the following year, and we shall no doubt find that the case this coming season. Unless we can find a market elsewhere for our apples we shall get only 1s. a case, and we do not want to come as low as that. (Hear, hear.) I believe we have beat our record in the London market and have realised better prices than other colonies, the Government doing the business both ends. We shipped 1,000 cases; Cleopatras brought from 11s. to 28s. a case, or an average of 17s. 7d. If we continue getting such prices it would not do, because we must know that but very few people could afford to buy the fruit at such a figure. So we must be prepared to take less if we desire to keep up the trade. Dunn's Seedling went up to 24s., with an average of 18s. 5d.; Stone Pippins sold up to 20s., the average being 17s. 6d.; Strawberry Pippin realised up to 20s., averaging 18s.

7d.; Garibaldi brought up to 21s., averaging 19s. 6d.; Bismarcks sold up to 20s., averaging 16s. 6d.; London Pippin to 20s., average 20s.; Rome Beauty to 24s., average 14s. 10d.; New York Pippin up to 20s., average 18s. 5d.; and Beauty of Australia up to 18s., averaging 17s. 5d.—a most excellent result. The only regret I have is that we did not ship twenty times the number of cases. (Cheers.) The charges came to about 6s. 1d. per case. Pears were not so successful. Vicar of Winkfield realised up to 20s. a case. Of Swan Egg six cases made 20s., while six cases sold at 6s. and four cases at 3s. Bergamot were useless. Of grapes, Almerias sold from 6s. to 15s., and twelve cases of Doradilla from 4s. to 5s. 6d. The quantity shipped was small, but the prices were exceedingly good. If we can only clear 3s. per case in London for our surplus fruit, especially apples, it will pay the producers in South Australia (Cheers), and I hope that the colonial Governments who are working together will be able to secure a reduction in freights and charges, and that what can be done in that direction will be done. We have established a typical orchard at Mylor, which is under the direction of the very able Director of the Botanic Gardens (Mr. Holtze). We know in the past how bitterly men engaged in horticulture have been disappointed in not getting trees true to name. Very often they have had to wait three and five years before they could tell how much they had been deceived. If we ensure to horticulturists the obtaining of trees they wish to purchase we shall be doing a great deal to assist them. I hope it will be used in the direction of establishing a school of horticulture. We have already an agricultural school near Adelaide, and we are going to establish two more, one in the North and one in the South, where young fellows who have left school will receive an education to better fit them for agricultural pursuits. Any visitors to the school in Adelaide cannot fail to be impressed by the work done there. One great drawback is that the scholars do not remain there long enough to get a thorough training. The masters in some of the State schools are doing splendid work in this direction, and are deserving reward. One teacher planted 200 plots with every variety of manure he could obtain, and did it all at his own expense. The Government, through their officer, Mr. Quinn, have been doing all they can to protect the fruitgrowers from pests. Our gardens are, fortunately, at present fairly free from disease, but the work in connection with this department has enormously increased. We do not admit fruit into South Australia now unless it is clean, and unless it is examined. Some thousands and thousands of cases are examined, the inspector and his assistant having their hands very full. I am sure you all recognise that we have in Mr. Quinn an exceedingly able and energetic officer. There is another thing which the Government have done, of which I feel sure you will all approve—we are importing a continuous baling press for hay and straw. It will be stationed at the Agricultural College, where our farmers will be able to see it at work. With our long railway carriage very often it is too expensive to fetch stuff to the market unless it is compressed very tightly, and I believe that the cost of this press will be more than covered by the saving in freights, owing to the possibility of putting a much heavier weight into a much smaller compass. You have a long and an interesting programme to go through during the next two or three days, dealing with questions which bear directly on our agricultural interests, and I hope that you will all go away from this Congress wiser and better men. In conclusion, I should like to ask you to give more support to our *Journal of Agriculture*, and in speaking to you I am speaking to the farmers throughout the colony. I think it is an exceedingly valuable publication. (Applause.) Articles are written by men who are experts in the different branches with which they deal. We have there given the results of experiments carried on throughout South Australia by practical farmers, and surely such a publication is worth 5s. a year.

A DELEGATE: It is worth double.

THE MINISTER OF AGRICULTURE: Then give double. The number of subscribers is increasing. The circulation of the *Journal* is about 2,000, and it is costing us about £800. The printing cost is heavy, but Parliament does not grudge the amount. They recognise that it is more than paying for the good it is doing. I hope that the farmers will recognise that it is *THE Journal of Agriculture*. You cannot have better testimony to the value of the contents than the fact that our influential papers are prepared to take articles from it, and circulate them through the medium of their own journals.

A DELEGATE: Without any acknowledgment.

THE MINISTER OF AGRICULTURE: We ought to have at least 5,000 subscribers to that *Journal*, and when we have that number we need not fear its paying its way. I hope that next September I shall have another opportunity of opening the Congress of the Agricultural Bureau, and if I do I am sure I shall be able to say that the good times we now expect have been realised, and that we have had a harvest unequalled for quantity and quality; that we have all benefited by the experiences of the past; and that the farmers of South Australia from one end of the colony to the other will be on good terms with each other, and will be recognised by the community as a class of people who are doing more than any other class to further the best interests of South Australia. I have very much pleasure in declaring the Congress open. (Prolonged cheers.)

MR. H. KELLY: I have very much pleasure in moving a vote of thanks to the Honorable the Minister for his able address. I have known Mr. Butler for many years as a practical farmer—one of those men who has risen to his present position through downright hard work. We have been told that we are likely to have a bountiful harvest; but September and October are very often very critical months for the farmers, and we should not be too sanguine yet. We have, however, the prospects of a very fine harvest and a good grass season, which is a great boon to farmers. When a farmer loses his grass it is a loss which he cannot make up again very readily, as it means very often the loss of his stock. I hope the Export Depot will continue the grand work which it is now doing.

MR. J. DAVEY: I rise with very great pleasure to second the motion. I have been very much interested in the Minister's address, and very pleased indeed to find that he is in such full sympathy with farming, and has such a grasp of the farmers' requirements. (Applause.) Being a practical farmer himself, he knows what difficulties we have to meet. The Minister is doing the best he can for himself, and therefore he will do the best he can for his fellow-colonists. (Hear, hear.)

MR. R. CAMPBELL: I have very much pleasure in supporting the motion. We are pleased to see Mr. Thomson, the dairy expert. Mr. Thomson visited our district the other day and lectured, but I am sorry to say that we had only one farmer's wife in the audience, when we ought to have had every farmer's wife and daughter with us.

DR. F. OCKLEY: I should like to support this vote of thanks to the Minister. We are told that it is proposed to have the quality of artificial manures guaranteed by an analyst. I should like to see the germinative quality for some of the smaller seed, for instance, rape and mustard, guaranteed. A person may get a sample from a seedsman and test it, and it may answer all right. But perhaps when you get it in bulk and have sown a large area, you will find that the germinating power was very much under the sample you received. I speak from experience. I think seedsman should be asked to give a guarantee as to the germinating power of a certain percentage at least of what they sell. (Hear, hear.)

Mr. N. ROGERS: In supporting the motion, I should like to point out that the inspectors of fruit very rarely reach farther than about Gawler. We in the North require visits from them just as the people in the South. We have the codlin moth and various other parasites; we have the sparrows, and we have the rabbits. At the present time, the Minister says Mr. Quinn is a very hard-worked man. I believe that he is too hard worked, by a long way; and if two or three inspectors were appointed to assist him, we should then have a chance of seeing him occasionally in the North. The fruitgrowers of the North want to profit by his services and advice.

The motion was carried with acclamation.

The MINISTER OF AGRICULTURE: I thank the mover and seconder and supporters for their very kindly references to myself, and I thank you all for the manifest approval that you have shown to my remarks to-day. I cordially reciprocate the sentiment that I may remain in my present position long enough to do a great deal more than I have yet had the opportunity to do. I recognise that education and agriculture are two of the most important departments, and I hope that I shall prove a real live Minister. I believed twelve months ago that the present Government were the best for the producers we have ever had, and I am more sure of it than ever to-day. I am sure that the Government which has been in office for over five years would hardly be human if they had not made some mistakes; they have had to administer affairs during exceedingly bad times, and during a period when the fall in the prices of produce has been unprecedented in the annals of our history. I hope that you will have a highly enjoyable week, and thank you, gentlemen, for your kind reception. (Cheers)

Chairman's Address.

The CHAIRMAN (Mr. F. E. H. W. Krichauff) read his annual address. Ten years and a half have elapsed since the first establishment of the Agricultural Bureau of South Australia. There has been no change in the membership of the Central Board during the past twelve months; but the number of Branches has increased, so that we now have 100, with about 1,400 members. We regret the deaths of Messrs. R. M. Bertram, Eli Dawkins, R. McPherson, and M. Ridler, and feel sorry to have lost the services of a number of members of country Branches who have removed to other localities. It would be a distinct advantage to the producing interests of this colony if some of the vacancies thus occurring could be filled up by some of the eminently advanced specialists who are conducting agronomical industries in the respective districts where their services could be availed of, and their advice would be invaluable for all.

In meeting you to-day at our Tenth Congress, I think we may congratulate ourselves upon the fact that during the past three or four years considerable progress has been made in scientific farming—a feature in agriculture which was not felt to be necessary when our pioneers took possession of land rich in virgin fertility, accumulated during ages prior to the advent of the farmer and grazier or pastoralist. Those conditions having passed by, the desire to become acquainted with the practices followed and the results attained elsewhere has become general; and the success that has followed a partial adoption of the knowledge thus obtained during the past two years, notwithstanding the dry season, has induced still larger numbers of farmers and many with increased quantities to apply commercial fertilisers in the cultivation of their cereal crops. With the present prospect of returned favorable seasons, those farmers outside of “Goyder’s line of rainfall” who in previous good years raised many fair crops of cereals off an area comprising more than half the total area under cultivation to those crops in this colony—have every reason to hope for still better results with the aid of commercial fertilisers. But not only sufficient

nourishment, in too many cases also better tillage is absolutely required, for the proverb is only too true, "That weeds eat with the farmer out of the same dish."

Our merchants have watched the signs of the times, and have not been slow to keep up with the demand for latest improved implements—chiefly combined seed and fertiliser drills—and have also imported large quantities of commercial fertilisers. Still, notwithstanding that fertilisers to the declared value of £23,564 have been imported during the six months ended in June last, the demand has exceeded the supply. Four years ago the total import of fertilisers for the whole twelve months only amounted in value to £643. This year the large quantity of fertilisers imported was very considerably supplemented by local manufacturers as well as by local guanos; so that our General Secretary estimates that quite £70,000 has been expended by our farmers upon fertilisers alone this season. I observe with pleasure, too, that we have ceased to export the large quantities of bones, as was formerly the practice, and several new bonemills have been erected.

Probably no one except our Treasurer would complain of the loss to the revenue of the colony of duties upon imported seed drills were our own implement manufactures to undertake the making of seed drills, with possible improvements to suit the wants of our farmers, and yet sell them more cheaply, as has been the case with several other agricultural implements. And this reminds me of the desirableness that the duties on drills and refrigerating and sterilising machinery for dairies should be removed, or at least greatly reduced.

I am informed by our Renmark Branch that great quantities of gypsum have been obtained from a place about eight miles from that settlement, and have been used with great advantage to correct alkaline efflorescence on much of their land. Pending the receipt of certain information which the Agricultural Bureau hopes to obtain from Germany, our Government Geologist has not yet reported upon the probability of discovering potassic and phosphatic deposits on Yorke's Peninsula.

The late dry seasons, with consequent poor crops and great losses of live stock, have doubtless impressed upon many farmers and pastoralists the urgent necessity for making provision against the certain recurrence of such disasters by the digging of wells, or the provision of cisterns and other reservoirs for water, as also to save all their chaff and straw, and put away stores of fodder in the form of ensilage whenever opportunity is afforded by the occurrence of a rainy season. It seems unnecessary to refer at length to the enormous quantities of water that often run to waste in creeks, or to the fact that the cost of conserving a very considerable portion of it would not be nearly so great as the losses occasioned by the necessity that is imposed upon settlers, nearly every year, to cart water and to bring to water their working horses and cattle, during the busiest times, long distances; or, by the obligation occasionally to shift all of their live stock to far distant pasturage, because there is absolutely nothing in their own locality for their animals to eat.

March is usually a very busy month for members of the Bureau, what with Agricultural Shows and Conferences of the Branches; but, owing to the drought probably, this year there were only three such Conferences during March and April last. The attendances at those Conferences were fairly good, considering the bad season, and the papers and discussions were well worthy of the persons who contributed so greatly to the practical utility of the gatherings. The cost to members attending the Congress and District Branch Conferences is considerable—especially to those who come from long distances. Endeavors have frequently been made to secure the concession of a free pass by rail to at least two delegates from each Branch attending the meetings, and

the Government have now placed upon the Estimates a small sum, which will enable one delegate to receive a second class return ticket free when attending such meetings.

With regard to Conferences as well as to Branch meetings it is to be regretted that in some cases fuller and better reports are not furnished of the papers read and the discussions thereupon. In some cases the papers are delayed, in the opinion of the General Secretary, until quite too late for publication. In one instance, at the Conference at Alford, the acting hon. secretary, who, I am informed, also conducts a local newspaper, undertook to furnish a report, but instead annexed all the papers for his own purposes, and failed to furnish any report whatever to the Central Bureau. Of course it is not necessary or possible to publish all papers in full in the *Journal of Agriculture and Industry*, but there are always a number of leading and useful ideas that can be brought out for the information of members and readers.

The field trials and shows arranged by our Branches during the past year have been numerous and always eminently successful. The practical knowledge thus obtained has enabled many farmers to intelligently select the implements and machinery best suited to their requirements after seeing them at work, and the education acquired by an inspection of the products of the field, farm, orchard, and garden, and of the manufactured products of the same, and the examples of utilised waste substances cannot have failed to prove widely beneficial.

Mr. George Quinn, Inspector of Fruits, &c., has conducted some experiments with spray compounds to demonstrate their efficacy against the ravages of the codlin moth caterpillars. After five sprayings with arsenite of lime and with Paris green respectively, and careful examination of all fallen and infected fruit and bandages it was proved that unsprayed trees in adjoining rows furnished 42.3 per cent. of infected fruit, trees sprayed with arsenite of lime gave only 5.3 per cent. infested, and with Paris green only 10.3 per cent. No very satisfactory reports have reached me concerning the efficacy of the glass traps baited with apple jelly in water, but the trials were not made until rather late in the season. The best form of the vessels had not been used, and the hot dry air rapidly evaporated the mixture, which had to be frequently replenished; still considerable numbers of moths were captured, including a good many codlin moths, in these traps by those who used them. In Europe and America it is well known that bats and owls destroy great numbers of codlin moths, which conduct their devastating work during the twilight principally, and in all countries where small birds exist they tend somewhat to reduce the pest. This fact emphasises the necessity for legislation to protect our insectivorous birds.

The well-known existence of numerous forms of insect and fungus pests and diseases in foreign countries and neighboring colonies, which have not yet been introduced into South Australia, justifies the somewhat stringent measures that have been adopted to prevent their importation into this colony, and it is to be hoped that the Legislature will consent to the enactment of the Phylloxera Indemnity Bill, which has been promoted by our principal vinegrowers. The report that grapes have been actually imported from Victoria over our south-eastern border shows the great danger of delaying such a measure.

In place of the Hon. Dr. J. A. Cockburn, now Agent-General, who, whilst he filled the position of Minister of Agriculture and Education exhibited the most active interest in the advancement of our agricultural industries and in the Export Produce Department, we now have the Hon. R. Butler, M.P., as head of the Agricultural Department, and he also actively assists the Bureau and the producers generally, so far as his opportunities permit. There is ample scope for increased activity in the whole of our producing industries,

for we cannot, in some respects, even satisfy the local demands, much less export requirements.

In our mild climate, where cattle are seldom stall-fed, and where it is not considered essential that dairy cows should be housed, there is certainly nothing like the tendency to bovine diseases which is so markedly prevalent in some colder countries; but the fact that tuberculosis has been reported as existing in some parts of the colony justifies the Bureau in urgently advocating the examination by competent persons of all dairy cows, chiefly for tuberculosis, but incidentally for other diseases, with a view of stamping them out. In a paper read by me at Petersburg some years ago I called special attention to the danger of becoming infected, for all persons milking cows or otherwise attending the infected cattle. Inspectors of slaughterhouses can also render good service in this direction by detecting and preventing the sale or use of meat affected by diseases, including the parasitic *Cysticercus cellulosæ* affecting the human eye, and *C. bovis*, which are both communicable to man. If they know these worms the inspectors may prevent the spread in the tapeworm stage. In Germany, it has been proved that meat subjected for three weeks to a freezing temperature in a cold storage room is made perfectly harmless when lightly infected with those parasites; but trichinæ would withstand four months' exposure to brine pickle. *Tænia solium*, and probably *saginata* (tapeworms) are also similarly affected by freezing. It has, at all events, been officially notified in Germany that the process had the result of an actual decrease of tapeworms in man and *cysticercus* in the eyes. Until such inspectors are appointed we can only appeal to the humanity of stockbreeders and butchers not to place upon the market knowingly any animals or meat affected with diseases so dangerous to human health and life. Such action would be worthy of contempt and punishment. It is manslaughter.

In livestock our excess of imports over exports during 1897 was 87,503 sheep, 13,912 cattle, 454 horses, and 759 pigs, and the exports were probably mostly stores or fat stock travelled for shipment from other colonies to Western Australia. Our export of wines has increased. Some exports of grapes to Europe have been very successful; and, for the comparatively small shipments of apples caused by the recent dry season, very high prices have been secured in several instances. We know pretty well now which kinds are best suited for export, and plantations of those sorts should be made on an extensive scale. The new orchard now being planted near Mylor, under the supervision of the Director of the Botanic Garden, will be of great value when the trees come into bearing, not only for identification and correct nomenclature, but also for many other educational purposes.

Although our fruitgrowers cannot rely upon a paying market locally for all they can grow, still there should be a very greatly extended consumption of fruit (and vegetables also), in place of the great quantities of meat, which is altogether unsuitable in this warm climate. The growers must co-operate and establish their own stores, depôts, and warehouses, where consumers may be enabled to purchase directly at all times from the producers, and thus save the exactions of the middlemen, which usually amount to 50 and 100 per cent., and often more, upon the producers' prices.

For export purposes, there is still room for much greater care in grading and packing fruit, and if fruits are to be canned or preserved, every effort should be made to get the packages up in the most attractive manner, and with labels, etc., that will enforce the attention of probable purchasers. Although the past two or three years of drought had caused a scarcity of culinary vegetables, directly after the drought broke up our local markets became glutted with splendid vegetables of several kinds; and, similarly, owing to our grand climate and fertile soil, from time to time we have a great surplus of peas,

cucumbers, tomatoes, and many other kinds. Such gluts, it is to be expected, will hardly be possible in the near future, because our modern means of transit are now becoming so perfect that distance has been practically annihilated, and science will soon perfect the methods of preserving by cold air insulation, or one of the many recent inventions, all kinds of fresh vegetables, fruit, and other food substances, so that the grower of asparagus, rhubarb, young peas, &c., will be able to compete under his open-air conditions of cultivation with the grower of the same articles within a few miles of London, Paris, and other great European cities, who is compelled to resort to glass and heated structures in order to supply local requirements. In fact, British and Continental gardeners have substantial reasons to fear Australian competition in horticultural pursuits of all kinds, so long as only the best fruit, &c., is forwarded, and it is to be hoped that South Australian gardeners will not be at the rear. Australians have no rivals, except Cape Colony, in the markets at such times that their products can be placed there, because the ripening seasons are opposite in all other cases.

Unfortunately the first attempt to establish Agricultural Science Classes at Gumeracha has failed on account of lack of interest by the young people.

The Journal of the Agricultural Bureau is superseded by the *Journal of Agriculture and Industry*, of which fourteen monthly numbers have been issued by the Department of Agriculture. The new journal being in book form is more convenient to save for reference, and as it contains a much greater amount of reading matter, it naturally is more expensive to produce, but the extra cost is amply justified by the valuable contributions by the Professors of Agriculture and Viticulture, the Inspector of Fruit, the Director of the Botanic Gardens, the Inspector of Stock, the Conservator of Forests, the Dairy and Poultry Specialists, and many other talented gentlemen, in addition to the matter which made our own journal so deservedly popular and widely appreciated.

Allow me here again to repeat the plea which for nearly thirty years I have continuously urged—long enough, indeed, to have allowed good-sized trees to have been grown—for the conservation and planting of forest trees. I will not now dilate upon the effect of forests upon salubrity of climate, their ameliorating influence upon atmospheric temperature, upon humidity, rainfall, and many other beneficial effects, nor to the grateful shade around the cottage and out-buildings for man and beast, nor their beautifying appearance upon the landscape. My appeal directly affects the pocket. I am glad that many arbor days are being held, that may teach the young to be fond of and to protect forest trees; but we must plant forest trees by millions. In various countries legislators and others are awakening more and more to the impending timber famine which must occur within the next two or three generations at the outside, unless unusual efforts are made to replace destroyed forests. Think of the vandalism which in parts of the United States of America has destroyed thousands and tens of thousands of square miles of forests. Lately the American Government has purchased some large tracts of land for forest planting; but these are only acres against square miles that require to be replaced. We cannot, therefore, hope for long to secure large supplies of timber from abroad, and these at very greatly enhanced prices. Let us, then, provide as quickly and as liberally as possible for our own requirements. In the southern and hilly parts there should be no difficulty in establishing forests of our valuable blue and red gums (*Eucalyptus leucoxylon* and *rostrata*); but in the north there may be some trouble in selecting the varieties of trees that will withstand the vicissitudes of the climate. We have just had experience of what may happen in the case of the Remarkable Pine of California (*Pinus insignis*), of which many thousands have been killed by droughts upon the plains where they had thriven for as long as thirty years in

some cases, whilst the Aleppo Pine (*P. halepensis*), the Sugar Gum (*Eucalyptus corynocalyx*), the Tooart Gum, and many other trees were not affected. Sandy and light soils which are liable to be blown away can be protected against such a disaster by planting belts of native Cypress Pine (*Callitris robusta*), or perhaps Sugar Gums, or Tooart (*Eucalyptus gonicalyx*), or Sheoak (*Casuarina quadrivalvis*), or other valuable trees, useful for timber or fodder in cases of emergency, as well as for firewood. Never forget the old saying, "Whoever plants a tree is blessed by his grandchildren."

Let me now conclude with the expression of my settled conviction that the work done by our Bureau (which of course means all the Branches as well as the Central Board), is second to none other in its importance. The prosperity of a nation is in proportion to the value of its productions, and these are increased in proportion to the intelligence and knowledge possessed by the most advanced producers of the natural laws which govern the arts of husbandry, and by these persons the seeds of rural and domestic economy are sown broadcast over the length and breadth of the land, resulting in a harvest of progress, improvement, and prosperity ever broadening as the years pass by.

Mr. W. G. F. PLUMMER: I have very much pleasure in proposing a vote of thanks to the Chairman. He has dealt with the various subjects in a most admirable manner, and deserves our special thanks. (Applause.) As regards the treatment of alkaline soils, there are hundreds of acres of alkaline soils on the River Murray now useless which could be made productive if there were a profitable means of treatment to make them so. I have read how in America they experiment with gypsum to make it productive. I think where we have facilities of getting rid of our dairy produce at a payable rate it would pay us to put down wheat, barley, and oats for ensilage. (Hear, hear.)

Mr. C. RICKS: I have very much pleasure in seconding the vote. We know our worthy Chairman because of his practical advice. Unfortunately it is difficult to make producers realise the benefits of co-operation, and I believe that this is a means of getting over the glut in the market. In nearly every shop window in Adelaide you see almost every variety of fresh or preserved fruit imported from various parts of the world, and yet in a good season growers do not know how to get rid of their surplus produce. In the Western Australian market at present you will find preserved vegetables of all kinds. I have two brothers there, and they say they had preserved vegetables from South Australia only once. We have been told about how to produce, but when we have a bountiful season we have not the common sense to deal with this produce profitably. By a system of co-operation, and by doing away to a great extent with the middle men, we will place the produce in the hands of those who are not now able to get it. There are hundreds of our population—the middle class, or better class, as they are called—who often cannot get a cauliflower, simply because the cost between the time the produce leaves the producer until it reaches the consumer is too great. I am a director of a co-operative concern which we have started, and I speak from experience when I say it is uphill work to attract men to put money into affairs of this kind. We can do anything if we combine. I long to see one combination, not only of farmers, but of gardeners, mechanics, clerks, and others working for the common good. (Applause.) There is nothing impossible with combination, but the secret of non-success is that we do not trust one another as a class. (Applause.)

Mr. HENRY KELLY: I have very much pleasure in supporting. As Chairman of the Bureau, you must be delighted to-day to see before you the faces of so many producers. You must be a proud man in witnessing this result after ten and a half years' work.

Mr. T. PRICE, M.P.: I support the proposition, and feel this morning as a member of the Agricultural Bureau that much of the credit for the success of the

Bureau can be claimed by the Chairman, who is more cautious than some others in his remarks here to-day. The men who work quietly with us, men who work with an object and an enthusiasm, are deserving credit. (Hear, hear.) From my experience of the Chairman, I claim that South Australia does not know the worth of the man, and does not appreciate his service to the extent it ought to. I thank you personally, Mr. Chairman, for the valuable suggestions you have made at the Bureau meetings week after week, and I am sure we ought to do something to recognise his valuable work more than we do. (Applause.)

A DELEGATE: The Chairman touched on forestry in his address. We see in the North beautiful gum trees and other trees beautifying the towns where there were formerly no such things. I know that the Chairman has done a great deal in advocating such work.

The motion was carried with acclamation.

The CHAIRMAN: I thank you very much for the vote. I hope that we shall be spared to assist South Australia, and more especially the interests of the producers in the colony. I shall continue to do my best in this direction. (Cheers).

Congress adjourned until 2:15 p.m.

SECOND SESSION.

The GENERAL SECRETARY (Mr. A. Molineux): I wish to make a short explanation. Just at the close of the proceedings this morning the remark was made by someone who desired to speak, "if the Secretary will permit." I desire to say that I cannot and do not wish to prevent anyone from speaking, but it has been the usual practice, after the Chairman and other persons have spoken, to refrain from moving, seconding and supporting votes of thanks to readers of papers. The practice is to pass a comprehensive vote of thanks at the close of the Congress. Our time is valuable, and every line of print has to be paid for.

Experiences with Codlin Moth, 1898.

Mr. G. R. LAFFER read the following paper:—

Having lost during the 1896-97 season fully 1,000 bush of apples and pears through the ravages of codlin moth, I was convinced that unless I could keep this pest in check I should have to give up growing those fruits. I determined, therefore, to do my best, and see whether it could not be successfully dealt with. It was necessary first to consider the principal sources of contagion. As the only orchard near mine (an old neglected one) had been destroyed on the recommendation of Mr. Quinn, I simply had my own place to look after. I was aware that, besides those from the old orchard referred to, a large quantity of moths had escaped from my fruit houses, a defect which I determined to remedy. I made these as close as possible; all cracks around doors and windows were pasted over with paper, likewise air-bricks and keyholes, a precaution which I hope to show was very necessary. The moths began to make their appearance on the 19th September, and kept on increasing in numbers through October, and reached their greatest number in November, when on a warm day they hatched at the rate of up to 100 per day. Although there had been no fruit taken into the houses since the winter apples had been stored, the moths continued to hatch in large numbers through December, and up to the 14th of January, a period of four months all but five days, which plainly shows the overlapping of the broods, as those hatched in the early part of October had laid their eggs, and their progeny had completed the cycle, and started another brood before some of those that had laid dormant through winter, spring, and midsummer had started work. I estimate that in one fruit house where apples had been stored the previous winter I destroyed fully 3,000 moths. I had paid great attention to the trees, had gone over them twice, once with scrapers, and had taken off all loose bark, and afterwards made a further examination. I had been particularly careful in pruning. Any limbs that were cracked or split were sawn away and destroyed, and any trees with bad butts were sawn down for re-working. I have taken as many as thirty-four larvae out of a cracked limb 2½ in. by 5 in. long. Careful attention to pruning is very necessary. I again found that the larvae went into the ground a good deal about the beginning of January, especially when the soil was at all knobby, and mostly within a couple of feet of the tree stem. It is therefore necessary that the soil should be cultivated fine and well.

In order to properly dispose of the infested gathered and fallen fruit I had a tank made of two 10ft. sheets of galvanized iron, curved in the ordinary way, giving a tank with a circumference of about 19ft. x 2ft. This will easily hold 35bush. of apples. I gather up all fallen fruit at least once a week, and with what is knocked off and picked (infested stuff) is put into sound corn sacks and carefully tied. The apples are placed in the tank, and remain there a week submerged in water, when they are taken out and fed to stock, and those that have been collected in bags during the week take their place. Bandages were placed upon each tree and carefully attended to every eight days; in this way a great many larvæ were destroyed. I am pleased to say that, by adopting the above precautions, I was eminently satisfied with the result, as I saved the majority of my crop, which, though a light one, amounted to about 850bush. I am the more satisfied, as owing to the overwhelming quantity of infested fruit in March, 1897, I got disheartened, as I did not know what to do with them; consequently the fruit laid about the orchard and rotted, and there must have been a large quantity of larvæ secreted about the orchard in other than apple and pear trees. I feel sure I shall be in a very much better position this coming season, owing to the action taken during the past. I sprayed all my trees once with Paris green, but with what result I cannot say, as I kept no unsprayed trees for comparison. In my opinion a large number of fruit houses will have to receive attention before we can expect to cope with the pest, as they are the great source of contagion. I don't think they can be dealt with under the present Act, but there is no doubt that a badly-constructed storehouse could keep a district supplied annually with moths, as they are kept dry all the winter, and are in the best possible condition to go forth in the spring and fulfil their mission. Fruit houses should be so closely constructed that they could easily be sealed up and fumigated if necessary. Cracks around doors and windows $\frac{1}{2}$ in. wide allow moths to pass out freely. I am very hopeful now that, with regular and proper attention, I shall be able to keep the moth in check. Attention must be regular and thorough; half-hearted measures will only result in disappointment and loss—in fact, it is an everlasting job.

I am pleased to see that there is now a more general inclination to comply with the regulations of the Fruit Diseases Act, and feel certain that if growers only knew what beneficial results follow the carrying out of the regulations thoroughly there would soon be no need to enforce the Act, with the aid of inspectors. It would be carried out voluntarily, as all must admit that wormy fruit is only a source of annoyance and loss. Old trees with bad trunks will either be cut down and reworked, or grubbed out, as bad trunks are only a shelter for larvæ. I would strongly advise examining quince trees, for, although they are not attacked so much as apple and pear trees, I have taken a large quantity of larvæ from them. The large sheets of bark that they shed make secure hiding places for the larvæ. Many growers feed the infested fruit to stock without destroying the larvæ, which is a great mistake, as a large percentage of them are likely to escape, especially with drops or windfalls, as usually when the fruit drops the larvæ are ready to leave it. By adopting a tank similar to mine this difficulty is got over. It entails very little trouble, as the same water will do for many lots, and it is certainly very easy to cart them to the tank and empty them in, while as regards taking them out, one man with a sieve would empty, say, 35bush. in about thirty minutes. The extra labor in soaking the fruits is therefore very little.

I may add, in conclusion, that I have prepared this paper at the request of the General Secretary, who thought the experiences of a grower who had suffered through the ravages of the codlin moth, and had attempted to cope with it, would be of some benefit to other growers. Personally, I enter into the work for the coming season very hopefully, as I feel confident that, as I have no slovenly neighbors to trouble me, I shall be able to keep the pest down.

THE CHAIRMAN: What is the size of the orchard?

MR. LAFFER: About thirty acres.

MR. H. KELLY: Have you ever killed any trees by using kerosene?

MR. LAFFER: I have used kerosene soap on the fruit trees, but I have never killed any trees by doing so.

MR. KELLY: Have you ever heard of its being done?

MR. LAFFER: Only in the case of young stock. I have heard of its being used for aphids and having killed the young trees.

MR. KELLY: Did you ever hear of kerosene being used for painting the trees and killing them?

MR. LAFFER: I never heard of that being done.

THE GENERAL SECRETARY: In California some years ago the growers used kerosene for scale, and after a time it got down to the roots and killed the trees. Since then they have given up kerosene. But in Melbourne Mr. Williams, with a special pump, uses kerosene diluted with water in the winter time for deciduous trees, and says it does no harm, and prevents mischief in many ways.

Mr. C. RICKS: When did Mr. Laffer spray?

Mr. LAFFER: When the petals dropped. I was very busy, and consequently the trees did not get a second spray.

The CHAIRMAN: What percentage of fruit did you save?

Mr. LAFFER: I did not keep any record, but do not think I lost more than 20 per cent.

The GENERAL SECRETARY: I think the experiment of closing up the fruit houses carefully is very valuable as showing what injury may be prevented by so doing. Mr. Laffer estimates that he destroyed 3,000 moths in one house during the season. If, however, after closing up the house he had given it a fumigation with sulphur, he would not have been able to catch any moths afterwards.

Mr. LAFFER: I was doubtful if sulphur fumes would have reached the moths after they had secreted in the woodwork. The winter coating round the caterpillars is very tough.

The GENERAL SECRETARY: We have proved that fumigation does kill them.

Mr. G. QUINN: These insects at every stage must have air, wherever they are secreted, and wherever ordinary air penetrates a strong gas will also penetrate. Mr. Stephen Hannaford, of Gumeracha, told me that for two seasons he used a sulphur box for disinfecting bags and cases, and he found the caterpillars were all destroyed.

Mr. KELLY: But he put the bags and cases into a box; that was a very close affair.

Mr. QUINN: So it would be here if the room were properly closed.

The CHAIRMAN: Did you find that the closing of the room did any injury to the fruit?

Mr. LAFFER: There was no fruit in it at the time. The moths hatched three weeks earlier than we anticipated they would, and then I closed the place up. It has one window, and as soon as they hatched they flew to it and so were caught. I put tanglefoot in the cellar, and that caught a lot. I have adopted a different method this year, having made an opening for them to come up from the cellar to the window.

Mr. VICKERS (Forest Range): Do you think sulphuring an airtight compartment will kill them at every stage?

Mr. QUINN: Certainly I do.

Mr. VICKERS: I think more are hatched in the houses than in the trees. I have scraped three or four acres of trees during the last few weeks and have not found a single grub. A week ago I took a spray pump out of a shed and found seven big fat fellows embedded in the nozzle of the pump, as it had been hanging in the shed. To talk about getting apple houses airtight and to actually get them so are two different matters. In the majority of cases, if we have a small crop of apples, the house is used for other purposes. There are hundreds of persons who cannot afford to build a place airtight, especially for apples. We want a cheap scheme for making sheds sulphur-proof.

Mr. QUINN: In most of the fruit-drying districts they simply make a framework and stretch calico over it, and then whitewash the calico once or twice. That will hold sulphur fumes. There is no difficulty in making a place sulphur-proof.

Mr. JENNINGS: How many grubs did you catch in the tank?

Mr. LAFFER: The fruit was put into the tank and submerged in water, and I found the grubs dead afterwards. I fed the apples from the tank to stock. I could not say how many grubs were killed in the tank. I have not dealt in my paper with the regulations, but I think the points I have mentioned should be looked into and provided for.

Mr. JENNINGS: Did the submerging in water fetch the grubs out of the apples?

Mr. LAFFER: Very rarely.

The CHAIRMAN: I think it would simplify matters if we now had Mr. Hutchinson's paper.

Mr. VICKERS: Let me first ask if Mr. Laffer emptied the apples out of the bags, or put the bags and all into the water.

Mr. LAFFER: I emptied them out. If you put the bags in, you will find it a cumbersome matter to get the apples out afterwards. By emptying them out, you can get the fruit spread out perfectly level, and then submerge it.

Mr. QUINN: I would like to give an experience of submerging fruit. I put a case of apples into a sack and plunged them into a tank, at about a quarter to 5 one evening, and took them out next morning about 10. I shook out some of the apples and cut them open. Caterpillars looked quite soaked and dead-looking. I then turned out all the apples, and threw the bag over the fence. It was a warm morning, and I soon found some of the caterpillars which were on the bag beginning to wriggle. They revived after being sixteen hours in water.

Mr. JENNINGS: I put two caterpillars into strong brine, formed of a tablespoonful of water and a teaspoonful of salt, and they stood it twenty-four hours, and the water all dried up. I thought they were dead, but they revived. I put them for another twenty-four hours into brine, and that did not kill them.

Mr. JACOBS: We are told that it is impossible for codlin moths to live without air, but if the larvæ will live for sixteen hours under water, would not the chrysalis exist in a room fumigated with sulphur? May it not exist for an indefinite length of time, especially if the fumes could not penetrate to it? I would like to hear how Mr. Quinn's statements can be reconciled.

Mr. KELLY: You must remember that the sulphur fumes are poisonous.

Mr. QUINN: Possibly you might be under water for several minutes and afterwards be resuscitated, but if you were in a bath of sulphur fumes you would not come round. I would not be afraid of destroying the pest with sulphur fumes. If you closed up a room you could fumigate it, and keep it closed as long as these larvæ were under water. The time taken to kill them could only be settled by a thorough test.

Mr. P. O. HUTCHINSON, Port Elliot Branch, read a paper on "Controlling Fruit Pests":—

Recognising the important part the pest question is going to play as regards the growing of various fruits is my reason for bringing this subject under the notice of this Congress. I do not intend to express an opinion as to what is the best practical way to cope with pests, as this is properly a matter for experts; but I think, as fruitgrowers are very considerably, if not chiefly, interested in the methods to be adopted for carrying remedies into effect, it is only fair that they should express an opinion on the subject. All who attend these congresses, and, indeed, all who are members of the various Branches of the Bureau throughout the colony, may be reasonably credited with taking a more or less intelligent interest in the pest nuisance; and, were the Branches to express an opinion as to what they considered the best means to adopt to prevent pests already in the colony from spreading, and the introduction of others, it might materially strengthen the hands of those in authority. People say, "It's all very nice for those with fixed salaries to preach to others as to how things should be done, but let them change places, and would they say the same then?" I am told some growers are so unselfish that they go to the expense of distributing throughout the clean parts of the colony some of their surplus pests, hoping that by so doing the cry against the stringency of the regulations will become so universal that they will be repealed. Perhaps a few black sheep may be found, but I feel certain that the majority of fruitgrowers would rather help one another than endeavor to increase their burdens. It is the misfortune and not the fault of the owners of infested gardens that they are so, and it is of equal importance to the owners of clean ones that pests should be kept down, not knowing whose turn may come next; moreover, the clean gardens, whilst saving their owners the trouble and expense necessarily incurred by those owning dirty ones, in addition return higher prices through the total output being reduced. Is it not then a fair thing to levy a small rate per acre on all gardens and orchards?—the amount thus raised to be subsidised by the Government. The money so obtained to be used for the purposes of paying

the salaries of inspectors, and affording some compensation to those whose means of livelihood have been compulsorily destroyed. We want some plan adopted agreeable, as far as may be, to the majority of growers, and then all to make it their business to see that the regulations are thoroughly carried out. If a remedy is sure it is better to adopt extreme measures and effectually stamp out a nuisance at the beginning, than keep playing with experiments and allowing the curse to spread. The great trouble, no doubt, is to prove what is effectual, and if this can be done, a still greater trouble is to have it conscientiously carried out.

Mr. QUINN: I am pleased with Mr. Laffer's paper, because I think that if the columns of the *Garden and Field* and the *Journal of Agriculture* were scanned for the last few years you would find my own conclusions have been almost exactly the same as those given here. It is satisfactory to myself to find a practical man, who has a monetary interest in the matter, advocating the same methods as I have done. Mr. Laffer does not appear to think that the present Act will cover regulations dealing with fruit houses; but the Act entirely covers that matter, and the necessary regulations could be framed. I quite recognise the difficulty alluded to by Mr. Vickers in respect to flimsy storerooms. Every man is not in a position to build an airtight house: but I think the difficulty could be overcome, because it is not so much a matter of preventing the caterpillars working out of the house as of having a close building that will prevent the moths going out. The moths will not attempt to go out through any substance—not even through a sheet of tissue paper—but of course the caterpillars will. If you have a storehouse where they are secreted, the fact of making the place airtight would be a cheap matter. I alluded just now to the painting of a lining of calico. That might be done with oil, which would keep in the sulphur fumes. Last year I fumigated hundreds of cases of Italian lemons in structures prepared very much after that style. Windows and airbricks were filled up by having paper pasted over them, and they retained the fumes all right. I am glad Mr. Laffer mentioned that he only sprayed his trees once, because someone told me that he sprayed with everything, and it had proved an absolute failure. I am very pleased that Mr. Laffer can say that the growers generally are inclined to comply with the regulations of the Fruit Diseases Act. My own opinion—formed by going amongst the growers in different parts of the colony—is that you can divide them into two sections—one man does all he can to keep his garden clean, and his next-door neighbor, perhaps, will do nothing, and wishes to be left alone. Mr. Laffer realised that such a state of things is ruinous to the man who tries to do all he can, and it is because of the neglected gardens that inspectors are necessary. The man who will do all he can requires no inspector; he attends to his own business. The matter of examining quince trees is very important. The larvæ will hide about the quince trees more than any others owing to the nature of the bark shielding them. Submerging the apples in water is the cheapest way of treating them for the larvæ. Mr. Laffer bases most of his conclusions on last year's work, and I would like to ask him and other growers if they found the second brood less numerous and injurious than in former years. My experience taught me that they were not so destructive. The moths that Mr. Laffer caught in the fruit house could scarcely be taken as indicative of the time the moths emerge in the open air. I have looked about amongst the trees a good deal, and never found an empty chrysalis case attached to a tree so early in the season. There are two, if not more, broods during the season, but they overlap so much that one becomes confused over them. Last year I found the eggs of the codlin moth. They are flat, and appear very much like a little drop of gum water, almost transparent, and about the size of the lead point of a pencil. The eggs do not seem to be laid in the calyx of the fruit. With regard to moths hatched early, I doubt if the caterpillars would find anything to live on if they came out now, though they might get at the loquat trees.

Mr. KELLY: Do they attack loquats?

Mr. QUINN: I have heard so.

Mr. VICKERS: Have you made any attempts to prevent the introduction of the Queensland fruit fly?

Mr. QUINN: Yes; the Customs officers refuse to allow any fruit to come in without being thoroughly examined. We are keeping a sharp lookout. A little while ago I obtained samples from Sydney of the maggots of the fly, and in one lot of bananas that came direct from Queensland I found several maggots. There is no doubt about the identity. So it is possible for them to come here. But distance is our safeguard. Most of the tropical fruits we get are taken to Sydney or Melbourne, and repacked there for this colony. The Queensland fly attacks the banana when the fruit is in the softening stage. Any which were sufficiently advanced when they left Queensland for the fly to have deposited eggs on them would be discarded in Melbourne, because they would be rotten. When you open a case and find all the bananas absolutely green you may be sure that they are not fitted to carry the fly. This examination entails an enormous amount of work, and I am glad our fruit-growers are supporting the authorities in the matter. In reference to Mr. Hutchinson's paper, I would say that we should use all the knowledge and intelligence we can in the direction of prevention. Prevention is certainly better than cure in this matter of fruit pests as well in other things. I have had a great deal of opposition and abuse on account of the strict stand I have taken in regard to orange scale, and am glad the growers are supporting me now. I am pleased with Mr. Hutchinson's paper, and think that if something of the kind he suggests were done it would be a good thing.

Mr. KELLY: How about the neglected gardens that he speaks of?

Mr. QUINN: My assistant says there are not many of them, but they are sandwiched in between the others.

Mr. JENNINGS: How many inspectors are appointed to examine the fruit that comes in?

Mr. QUINN: There are two.

Mr. JENNINGS: Is it not possible that the eggs may get into the fruit, and if some were deposited in an orifice may they not survive fumigation? Even if the orifice did not close, would not the air in it expel a light body like gas? Unless there is a hole on the other side to permit of the gas being drawn in, would not the eggs escape? That is the weak point about fumigation, it appears to me.

Mr. QUINN: Bananas are not fumigated at all.

Mr. JENNINGS: I have heard that the Queensland fruit fly has been seen at the market here.

Mr. QUINN: Oh, no; it is not the Queensland fly.

Mr. JENNINGS: The fear I have is that you have not help enough to ensure its exclusion. If you have not enough assistance, it should be provided. Everything should be done to keep that fly out, because, so far as we can see, it will penetrate everything—bananas, plums, cherries, apples, pears, and so on, and grapes as well. If we get the pest here it will mean our saying good-bye to orchards and all.

The GENERAL SECRETARY: I think there is a house being erected where imported fruit will be treated and fumigated. The fumes will be forced through every particle of space where air can get.

Mr. R. M. HACKETT: Is it the intention of the Government to fumigate fruit cases as well?

Mr. QUINN: I cannot answer for the Government. It has not yet been decided that all fruit should be fumigated. Supposing maggots bored into bananas and there was an orifice, you could not fumigate them without spoiling the fruit. Our object in erecting the house was to fumigate Italian lemons

and all plants that are brought into the colony. A lot of pests may be brought in by plants.

Mr. JENNINGS: I hope that the export certificate is not taken as satisfactory. They should be examined here again.

The GENERAL SECRETARY: So they are.

Mr. QUINN: If we open a case of bananas and find them green, we know then, by the experience of years in Queensland, that the fly has not deposited eggs on fruit in that condition. If the fruit is ripe we look through the whole lot, and if anything suspicious appears we reject the whole lot. I fail to see what more we could do. I may state that the hatching of the eggs takes place in a very much shorter time than it takes to travel from Queensland to Adelaide.

A MEMBER: Are dried apples inspected when they are imported into the colony? I ask this because I have found any amount of codlin grubs, little and big, in dried apples.

Mr. QUINN: Dried apples are not inspected. I am very sceptical about those being codlin moth grubs.

Mr. JENNINGS: I found the larvæ among some dried apples. I put some Duchess pears in a cupboard, and believe the larvæ was introduced in that way. I have examined them closely, and believe them to be codlin moth. [Mr. Jennings has written me since that he finds these are not the codlin moth caterpillars.—GEN. SEC.]

Mr. JACOBS: In my district I had the pleasure of Mr. Quinn's company for two days, when searching for codlin moth. I should like to know if Mr. Quinn has discovered a natural enemy for the codlin moth.

Mr. R. CAMPBELL: Regarding the grubs found amongst dry apples in a bag, I may say the ordinary moths which trouble the drapers will penetrate into bags and all kinds of places in a house.

Mr. W. G. F. PLUMMER: I am residing on the river, where we haven't got the codlin moth. But infested apples have been sent there, and if I had not known that the pest was a dangerous one they would probably have been spread about the district. Is there no law to prevent fruit being so distributed about the colony?

Mr. RICKS: We have heard of Mr. Laffer's treatment with special advantages in his favor. But how shall we compel those who do not spray or protect their trees to take measures to prevent the spread of the pest? Mr. Laffer has proved that the codlin moth will breed in and spread from the fruit houses. The question is, how are we to deal with the people who will take no precautions against the pest?

Mr. QUINN: If Mr. Plummer had held those infected apples, and had written down to us, I would have taken out a summons against the man who sent them out, and he would have been heavily fined for doing so. (Hear, hear).

Mr. W. MERCHANT: Any of us who have attempted to combat this pest will have to acknowledge that they are simply learners. Before the codlin moth was introduced here they had it in California, and there is a very large quantity of infected fruit, even where growers have been attempting longest to fight the pest. I can quite bear out Mr. Laffer's contention as regards the fruit houses. Many people had been innocently storing the fruit for years past, and had no idea that they were keeping a place where the pest might be preserved; but we are certain now that in the fruit houses we have a great source whereby the evil spreads during the following season. With regard to Mr. Laffer's idea about some of the regulations brought to bear on this matter, I can hardly see how they can. If you were to endeavor to force men to fumigate fruit houses, you would have the same cry as you have now against the picking up of fallen fruit, and, although we say that these things ought to be attended to, still we

know that as soon as there is any attempt to enforce the present regulations the public sympathise with the people who are prosecuted. We had a case last year which justifies what I say. It was brought before a court, and on just a mere quibble the case was upset and the Government had to pay the costs; and the defendant had a latitude to go on in the future as he had been doing. Unless we can deal with the subject with some amount of certainty, and have regulations which we know can be enforced in court, according to the intentions of the Act, it is useless to deal with negligent growers in a more stringent manner than we are now doing. The simple regulations we have now are not enforced. A great many owners of orchards do nothing, but leave the work of suppressing this pest to their neighbors, and simply snap their fingers at you if you ask them to do their share. If it is so impossible under our present regulations to do this, how much more impossible will it be when we come to spraying, which, at the best, is a disputed remedy. I will allow that Mr. Quinn has done his best, but he cannot be everywhere, and however much he may seek to do, unless he is aided by the gardeners themselves, he cannot be successful. (Mr. Quinn: Hear, hear.) With regard to spraying, I believe in it to some extent, but it is still a contested point. Bandaging is not so. With regard to picking up fruit, that is not so. I have been experimenting with spraying for some years past for scab and codlin moth, and I am content to spray again; but I think we would be going too far if we said that spraying would stamp out the pest. Mr. Hutchinson's paper was short and practical, but the question is—shall we get the growers generally to agree that the Acts should be amended and rates levied so as to provide compensation to those who may have to destroy orchards, and to assist in paying the cost of inspection? For my part I do not think you will. There is a want of unanimity amongst us. I agree and believe it is necessary that something should be done. I believe that if we all did our best we could keep the pest under; but I am afraid that we are not sufficiently united. Mr. Laffer is in the position of having no neighbors. Unfortunately, so far as the codlin moth is concerned, there are persons in my district who do not take the same interest in fighting the pest as I do, so I labor under a disadvantage. Unless we make people realise the utility of carrying out this work, the regulations will be of no value. You will want a small army of inspectors, and even then it will be doubtful if you can stamp it out. I am as fearful as others in reference to the Queensland fly. The pest is stated to have been seen in the East-End Market frequently, and very recently.

Mr. JENNINGS: Have they seen the fly or the moth?

Mr. MERCHANT: They have told me that they have seen the fly.

Mr. QUINN: I have not found anyone in South Australia yet who knows the fly and its larvæ. You will very frequently find in the bananas imported great numbers of maggots. I have taken home a number of these maggots and hatched them; but they are not fruit flies. Fruit fly maggots are as distinct from the ordinary maggot as a silkworm is from a codlin moth. I do not think there is any foundation whatever for the statement made to Mr. Merchant.

The GENERAL SECRETARY: With regard to the codlin moth, I was the first to get into trouble and to be called a pessimist, because I said it would come here, I have read a great deal about it, and corresponded with many authorities in America on the subject, and the consensus of opinion is that spraying is an effectual means of dealing with it. We must pay some attention to the experience of countries which are similarly affected, although some persons are prone to say that a remedy that will answer in another part of the world may be of no use here.

Mr. W. MERCHANT: You must not take me to mean that spraying is not effective.

The GENERAL SECRETARY: Oh, no; I do not mean that.

Mr. MARCHANT: Even in America the codlin moth is a puzzle to the fruit-growers to-day. If spraying had been so highly effective, how is it that the same contention is being gone through there concerning it as is the case here? It seems to me that their position is similar to our own. I get the *American Agriculturist*, and paragraph after paragraph in it deals with the one tale, "wormy fruit" or "fungus."

The GENERAL SECRETARY: The reason is that some people there, like some people here, will not spray; they trust to Providence

Mr. N. ROGERS: I have been pleased to listen to the discussion on the codlin moth. But there are other pests just as troublesome. Some of us present reside in a district where apples will not grow, and where other fruit that will grow is badly served. For instance, we have the crow, and nothing we can devise will keep him away from the fig trees. Then there are the sparrows and silver eyes—

The GENERAL SECRETARY: What about the larrikins?

Mr. ROGERS: It is not sufficient to frighten these birds. Three years ago I had a trellis of vines, and the birds ate all the grapes. Apricots, peaches, and other fruit are served the same way. How are these pests to be dealt with? At the present time the district councils and others are supposed to deal with the sparrows, but the pest is not suppressed. The sparrows are in the haystacks, in the old sheds, and under the roofs of houses. I should like to hear how the Act can be enforced. It is evident that these birds will eat us out.

Mr. JENNINGS: Does the Secretary say that the grub found in dry apples and pears is not the codlin moth?

The GENERAL SECRETARY: Yes, most positively.

Mr. MITCHELL: In our district in the North parrots and crows are our worst enemies. Gardens during the last three or four years have been so much attacked by parrots that the fruit has been practically destroyed for market purposes. The deficient supply was the only reason for it being saleable. Parrots are the worst sinners, and the crows come next. Silver eyes are not so bad. Parrots entirely destroyed the apricots, peaches, and pears. For the last three years I have gathered a dozen sound pears from about thirty trees. I think that something ought to be suggested, if possible, for dealing with this matter, because it is almost as serious as the codlin moth. There is no codlin moth in my district that I know of. I have tried poisoned wheat for the parrots, and found that they have too much sense to eat it. The only effective plan I know of is to stay by the trees and shoot the birds when they come.

Mr. C. RICKS: At Cherry Gardens we keep down the sparrows by giving prizes for the largest number of heads brought to us. Every month 9d. is given as the first prize, and 6d. as the second; then at the show someone gives a guinea for the largest number of heads got by one person during the year. The boys bring in the heads, which we get from them, and a list is kept. If every Branch Bureau would adopt that plan the gardeners' enemies among the birds would be reduced materially. If the people see that the district councils do their duty it will be all right.

The CHAIRMAN: During the last two or three years the birds have been worse than formerly because they have not been getting their proper food.

Mr. MITCHELL: But having acquired a taste for garden fruit, will they relinquish it? Some gentlemen are of opinion that parrots are rather the friends of the gardeners, but I think that must be an erroneous idea. From the formation of the parrot's beak I should say that the bird is not adapted to the work of clearing insects from gardens. I do not think they are the friends of the gardeners at all.

Mr. W. MERCHANT: I grow a large quantity of cherries. In some years, during the whole time I have been cherry-growing, we have had to keep men

with guns from daylight till dark to keep the wattle birds away from the fruit. Now, according to a theory just advanced, the wattle birds having tasted cherries would not go back to their natural food; but whilst in some seasons they take all the cherries they can get, during other years you will scarcely see a wattle bird in the garden. The fact is that the birds stick to their natural food until it fails, and then they take fruit.

Mr. KENNEDY: This takes me back to the first orchard, I think, planted in South Australia. For many years the grower successfully combated all the birds and opossums by paying a trifle to get them shot. He always had any quantity of good fruit. With regard to the destruction of the codlin moth, many of us have planted gardens during the last few years, and at the same time have been purchasers of fruit. In various parts the Branch Bureaus have had inspectors at work, but I do not think they are able to do any good, because fruit infested with codlin moth is continually brought into the districts. Infected fruit, for instance, may be sent from Adelaide to Kadina, and of course the moth then has an opportunity of spreading. In the interest of districts which are now free from the pest, a law is needed to prevent infected fruit being distributed.

Mr. W. C. GRABBY: I would suggest that the question raised by Mr. Hutchinson regarding the levying of a rate to help pay the cost of efficient inspection and for compensation to owners of orchards destroyed should be referred to the Branches for discussion. (Hear, hear.) Professor Slingerland, of Cornell University, who has written the latest and best treatise on the codlin moth, says—"From one-fourth to one-half of the apple crop in the United States is usually ruined by this insect. . . It usually causes a greater monetary loss to the apple-grower than all the other insect foes of the apple combined, yet it can be often more easily controlled than the apple-borer, the canker-worms, and several other orchard pests. . . It is a well-established fact that those who combat their insect foes with least trouble the most successfully and get the most fun out of it are those who study the habits and learn their life histories." Professor Fred. W. Card, of Nebraska, in a letter to me dated August 3rd, 1898, says - "It seems to me that your regulations are too stringent. I do not see how orchardists can afford to inspect, pick, and destroy fruit once a week." I had sent him a copy of our regulations and asked what he thought of them. We have to get at the bottom of this question as nearly as we can. We must accumulate our evidence and base our conclusions upon facts. We must not seek to square the evidence with our preconceived ideas, but be willing to abandon our former views in the face of new facts that do not uphold them. Professor Card says that if the inspection and the picking and the destruction of infested fruit can be enforced and is attended to nothing else is necessary. He says that thorough spraying may reduce the labor of picking injured fruit. But I will read the concluding portion of his bulletin:—"The codlin moth eats too many apples in Nebraska. It does not follow the instructions laid down for it by entomologists and horticulturists in the literature of the past. It does not lay its eggs in the calyx cup at the time the trees are in bloom, where the young larva can feed on the poison prepared for it, and dutifully pass away as a well-behaved worm should do. Apple trees are generally in full bloom here about the 1st of May. By the 15th or 20th the calyx is tightly closed. During this time the codlin moth sleeps in its winter quarters. When the mists of the spraying machine have cleared away it emerges and carelessly scatters its eggs upon the upper surface of the leaves. This occurs at Lincoln about the first week in June. Eight to ten days later, or in less time when the weather is warm, the egg hatches and the young larva scuds for a hiding place—generally within the calyx cup. A few eat a little of the leaf before doing this. It lives in the apple some ten to fourteen days, grows fat, leaves it, finds a hiding-place, spins its cocoon, changes to a pupa,

and comes forth as a moth about a month after the egg was laid. The hustlers which emerge early in spring may pass through four generations in a season; the laggards get through but two; the majority three. The codlin moth should be banished. This is not easy. Spraying alone, as generally recommended, will not do it. The moth is not easily poisoned. Lights in the orchard do not attract it. Sticky fly paper will not hold the larvæ. Only four-fifths of the larvæ enter at the calyx. Late spraying with Paris green alone is not effective. Spraying before the calyx closes does much good. Three sprayings at Gibbon saved 80 per cent. of the fruit. In laboratory trials, kerosene emulsion, sprayed while unhatched eggs are on the leaves, is effective. Late spraying with Paris green and Bordeaux mixture combined, with whale-oil soap or with lead acetate and sodium arsenite, is safe and does some good. Scraping the bark and tacking paper bands around the trunk when the larvæ are pupating will catch many. Screens in the cellar windows in spring will confine the moths which went in with the apples as larvæ in the fall. I suggest that you spray thoroughly with Paris green within a week after the blossoms fall, before the calyx closes. Try kerosene emulsion when the eggs are being laid upon the leaves. If this fails use Paris green combined with Bordeaux mixture instead. Keep the trees smooth, and use paper bands around the trunk when the larvæ are ready to pupate. Remove and kill the larvæ one and two weeks later. Place bands on again five or six weeks afterwards. Leave them until all apples are out of the orchard, then gather them up and destroy the larvæ. Get the balance in spring by screens over the cellar doors and windows. Observe for yourself how many of these precautions you can omit." Professor Slingerland says:—"However, 75 per cent. or more of the young worms enter the fruit at the blossom end, and our observations indicate that they spend several days feeding around in the calyx cavity. . . . The codlin moth usually spends from twenty to thirty days of its life as a caterpillar feeding inside the fruit. . . . The number of broods varies in different localities and in different years from one to four, and these overlap. . . . We have learned how to quite successfully control it when there is one and a partial second brood, but where there are more than two broods we are not so successful." The Professor recommends very strongly that the trees be sprayed with Paris green after the petals fall and before the calyx cup closes. The later the spraying, provided the poison can be got within the cup, the better; but he thinks later sprayings are of little use. He says:—"Not enough of the spray can be made to stay on the surface of the fruits to reach one in 100 of the worms which enter elsewhere than at the blossom end. . . . We can conceive of no possible way in which a majority of the 15 per cent. or 20 per cent. of the worms which enter the fruit at some other point in the spring, and all of the subsequent broods, can be effectually reached with the poison spray." The codlin moth, I believe, has been known for about 2,000 years, and for 200 years it has been written about more or less frequently. For the last forty years the literature upon it has been considerable, but it was not until a few years ago that the egg was correctly described. I know Mr. Quinn discovered the egg before he found a description of it, except erroneous ones. The summing up of Professor Slingerland's bulletin is as follows:—"Thus while the spraying method is very effective it can never prove a perfect panacea, especially where there are two full broods or more of the insects in a season." The Professor recommends one thorough spraying, and says:—"This one application will be just as effective, we believe, if thoroughly done as half a dozen later applications. The sole aim of the fruitgrower should be to have a dose of Paris green in the calyx cup when it is covered by nature. . . . No perfect panacea for the codlin moth has yet been found, but by thorough work by a Paris green spray we can often save at least 75 per cent. of the apples that

would otherwise be ruined by worms. Where more than two broods of the insect occur during the season, as in Kansas, Nebraska, Oregon, New Mexico, California, &c., the poison spray is not so effective, for although 75 per cent. of the first brood of worms may be killed with the spray, the few worms left will form a sufficient nucleus for a large and very destructive second or third brood. In these localities the best that can be advised at present is to supplement the poison spray with the old bandaging system." The point is distinctly this: that the value of more than one spraying is so extremely questionable that if we observe the other precautions it will pay us better to confine our work to one. I think the evidence will bear out that contention, and that one spraying of Paris green with Bordeaux mixture (1lb. Paris green to 200galls. of Bordeaux mixture) will be sufficient; but if we spray we must remember to do so before the calyx cup closes. All the authorities are agreed on that, because 75 per cent. of the insects entered the apple through the calyx cup. Referring to the grubs in dried apples, I may say that there is as much variety in caterpillars as there is in breeds of sheep. Take a man who is a good apple-grower, but has never studied sheep, and he may be excused for not being able to tell you the different breeds of sheep. Take even an entomologist, and give him only the larvæ of several kinds of moths, and he will very likely not risk a definite statement about them until he has bred the perfect insects. Now, if a trained entomologist will not do more than express an opinion until he has bred out the perfect insect, is it not a little injudicious for any gentleman here to say that he has discovered the larvæ of the codlin among dried fruit, and he will send you the moth?

The GENERAL SECRETARY: Regarding parrots in the North, several methods have been tried of getting rid of them—shooting, poisoning, and other ways. One method highly recommended where you only have a few trees is to get a lot of old fishing nets and put them over the trees. There are plenty of old fishing nets to be had cheap at Port Adelaide, and if it costs a shilling or two to cover a tree it would not be expensive, and the nets would keep the parrots and crows away. Afterwards the nets could be taken off and stored and made to last perhaps for twenty years. The silver eyes will go through the nets, and the only way to keep them off is to put double netting.

EVENING SESSION, SEPTEMBER 7th.

Ear-Cockle.

The GENERAL SECRETARY: I wish to direct attention to some ear-cockle, or purples, which have been brought down from Bowhill. On the Murray Flats some time ago this ear-cockle was discovered, and some members were rather taken with the kind of wheat amongst which ear-cockle was found, and began to sow it. Where they sowed it they also scattered the ear-cockle, which will live in the ground for ages. You may dry it, and it appears dead, but it goes on living all the same. It is like a little round ball of smut, only it is purple in color. If you find any plants with it pull them up and destroy them at once, and be very careful not to sow seed with ear-cockle or any other foreign matter in it.

Further Experience with Manures.

Mr. Joseph Correll (Minlaton Branch) read the following paper:—

Two years ago I had the honor of addressing a large number of intelligent farmers in this room; I am again here for the same purpose, at the request of our energetic and efficient General Secretary.

In this paper I shall endeavor to give details of our (my brothers and myself) various manurial experiments with cereals, and various other items which I think are of considerable importance.

As I shall refer to phosphate manuring particularly, I would like to make it clear what is meant by phosphoric acid, and to do this will give an extract from Professor J. F. W. Johnston's "Elements of Agricultural Chemistry." He says:—"If a piece of phosphorus be kindled in the air, it burns with a brilliant flame, and gives off dense white fumes. These white fumes are phosphoric pentoxide (P_2O_5). They are produced by the union of the burning phosphorus with the oxygen of the atmosphere. One hundred pounds (100lbs.) of phosphorus, when burned form 229½lbs. of phosphoric pentoxide, this when combined with water (H_2O) forms phosphoric acid. This acid is very sour and corrosive; it combines with lime, potash, &c., and forms phosphates, and in these states of combination it exists in soils and manures, and enters into plants."

As "the proof of the pudding is in the eating," or, in other words, the value of manuring cereals, &c., should be judged by the results of the application thereof, I cannot do better than give details of a number of experimental plots of wheat and oats sown in years 1896 and 1897. You will remember that the early part of 1896 (up to August) was somewhat favorable as regards rain; but unfortunately we had such a dry spring that the results were comparatively disappointing. Still the manured crops, in our district at least, were so much better than those unmanured, that there was very little indeed sown the following year without manure. In 1896 some test plots, which we reaped and cleaned separately, yielded thus:—

No. 1.—Fourteen and a half acres Dart's Imperial wheat, sown in May, manured with 1cwt. Thomas phosphate and bone superphosphate, mixed in the proportion of five of the former to two of the latter. Average yield, 11bush. 56lbs. I would here state that although these two phosphates should not be mixed together, the superphosphate apparently did not suffer in this case, as it was dry and well made, and the two were mixed up and sown at once. On the above plot we grew the previous year a crop of Algerian oats which yielded an average of 33bush. per acre.

No. 2.—Fourteen acres fallow. Baart wheat, drilled on June 11th with bone superphosphate (colonial), 1cwt. per acre. Average yield, 10bush 40lbs.

No. 3.—Seven acres fallow, sown with Australian Wonder wheat, same date and same manures. Average, 8bush. 30lbs.

No. 4.—Eleven and three quarter acres fallow. Dart's Imperial wheat, drilled in with 120lbs. bone superphosphate. Average yield, 8bush. 33lbs.

No. 4a.—Fourteen and three-quarter acres fallow. Dart's Imperial wheat, drilled in with 120lbs. Thomas phosphate per acre. Average yield, 10bush. 50lbs.

No. 4 and No. 4a were sown side by side for comparison on similar soil, at same date and same amount of cultivation. The plot manured with superphosphate yielded considerably more straw, and consequently would have been better for a hay crop but was disappointing as a grain crop, yielding 2bush. and 17lbs. less per acre. There was approximately 3.50 per cent. nitrogen in the superphosphate. We also sowed a quantity of sugar refinery bone charcoal, but it was a comparative failure for that year, owing to dry season; but we are now reaping the benefit in grass. Our average for the year was slightly over 8bush.

Last year was most unsatisfactory for testing the various manures; but was a good test of the value of phosphate manuring. I do not think that on our farm we would have got our seed back if we had sown broadcast without manure; as it was we averaged 5bush. wheat, which left a balance on the right side. As our previous experiments convinced us that it would not pay to give an excessively high price for bone superphosphate containing nitrogen, we did not use any last year. Of the phosphates we used Thomas "Star" brand, containing 5.56 per cent. phosphoric acid soluble, and 14.94 per cent. insoluble; Thomas phosphate, "Leeds" brand, 9.33 per cent. phosphoric acid soluble, and 10.13 per cent. insoluble; and Ohlendorff's mineral superphosphate, containing 16.63 per cent. phosphoric acid soluble, and 1.11 per cent. insoluble. We also used a good quantity of nitrate of soda mixed with the Thomas phosphate; also test plots with muriate of potash and kainit.

A test plot of about eight acres of wheat on red sandy clay soil, half of which was manured with Ohlendorff's superphosphate and the other half Thomas phosphate. "Star" brand, yielded between 6bush. and 7bush. and slightly in favor of the latter manure. The superphosphate plot grew better at first, but evidently could not stand the dry spring so well. About sixty acres of Algerian oats, manured with Thomas phosphate and nitrate of soda, yielded about a ton of hay per acre. About fifty acres in same paddock, Algerian oats, manured with Ohlendorff's superphosphate, yielded not quite so well.

We put in test plots with Cape oats thus:—

No. 1.—Thomas phosphate, 112lbs.; kainit, 100lbs.

No. 2.—Thomas phosphate, 112lbs.; kainit, 100lbs.; nitrate of soda, 10lbs.

No. 3.—Thomas phosphate, 112lbs.

Each of these mixtures was sown on about an acre. We could not detect any difference in any of these plots, so did not reap separately. The average was about four bags. We also

top-dressed patches with nitrate of potash (containing nitrogen and potash), but could not notice any better result.

No. 4.—A few acres of Dart's Imperial wheat, sown on land similar to above, in same paddock, yielded 10bush. per acre.

No. 5.—A plot of Leak's Red Talavera yielded 8½bush. This being a long slender-headed wheat, was somewhat blighted; otherwise it would have yielded as well as the Dart's Imperial.

I am inclined to think that the chlorine contained in the kainit has had an injurious effect on the land, as the self-sown oats growing there do not look so well as where none was applied. We sowed ½cwt. of muriate of potash in corner of a fallow paddock with about 1½cwt. Thomas phosphate on one acre. In this plot was sown peas, wheat, oats, turnups, &c. (Owing to the dry spring, this crop was a comparative failure. The wheat sown on July 8th averaged at rate of 3½bush. per acre. We have the above paddock in wheat this year, but cannot notice that the muriate of potash is having any beneficial effect, although ½cwt. ought to show on the crop if the land is deficient in potash. The soils on which the several potash manures were sown varied somewhat, but were of the nature most likely to be deficient in potash. This year we have small plots manured with sulphate of potash, which appear to be benefited by its application. These plots are on land which has grown a great many heavy crops of wheat, oats, and barley. I am not yet prepared to say whether the application of potash in conjunction with phosphates is necessary—it will need a series of field experiments to prove this. Sulphate of potash is probably the best form in which to apply potash, as in sulphate there is only a very low percentage of chlorine. However, I fully expect that it will eventually be found necessary to apply potash in some form or other. At present I find that potatoes are benefited by potash.

I now come to the conclusions at which we can arrive by all these experiments and test plots. First—It has been very clearly demonstrated that all classes of soil are deficient in soluble phosphoric acid, because wherever phosphoric manure is applied it gives good results in a greater or lesser degree. Secondly—Those phosphoric manures which contained no nitrogen give as good, and sometimes better, results than those which contained a good percentage of nitrogen; the nitrogen, I think, being a positive disadvantage in an excessively dry spring.

This year I have visited a number of the best crops in the district, and from all appearances those manured with purely phosphoric manures are the most promising. Two of the best crops are those of Mr. J. Nankivell and Mr. John Cudmore on fallowed land.

The phosphates appear to give the best results in grain on stiff red sandy clay soils, which occur in patches on the Peninsula. The best wheat is growing on some of these patches which grew next to nothing before being phosphated. Although I have never had any of this class of soil analysed, I am forced to the conclusion that it is really the richest soil of all (especially in potash), except that it is naturally deficient in phosphates. Last year, owing to the drought, those farmers who sowed in poor and loose red or white sand got the best results, simply because these soils collect more moisture from the air. Some neighbors averaged something like 10bush. The soils which gave the poorest returns were the rich dark humus soils. There are many very valuable lessons to be learned in preparing the ground before we will succeed in growing very heavy crops.

Professor Lowrie has expressed the opinion that the average yield of wheat for South Australia ought to be and could be raised to 11bush. or 12bush. per acre, and I quite agree with him; but before this result can be obtained farmers generally will require to adopt other methods of cultivation than merely scratching the surface (as many do). Here and there you will find men who always have decent crops; these always take care to have a good portion of the land intended for their next crop of wheat fallowed up in good time, then they take care to have it kept free from weeds by scarifying or sheep, or both. Mr John Cudmore, of Minlacowie, is one of these, and to him great praise is due.

But before we can succeed in getting the best possible results from the land we shall have to go in for better cultivation still. I mean in the direction of subsoiling. I hope I will not be misunderstood here; by subsoiling I do not mean turning up a lot of poor rubble to the surface, such as many will begin to talk about when the subject is broached. An extract from Alfred Sibson's *Agricultural Chemistry* will best explain what is meant by subsoiling.—“The principal effect of ploughing is to break up and loosen the soil so that the air, which, as we have seen, is so necessary to a fertile and healthy condition, may freely penetrate through it in every direction. The roots of plants will generally only descend so far from the surface as this loosening by the plough extends. The depth to which the plough can be used will, of course, in a great measure be regulated by the natural thickness of the soil; but in many cases no reason exists why this natural depth should not be extended and the soil deepened by encroaching on the subsoil. On some kinds of land great improvement has been effected by this means. To this end deep ploughing and subsoil ploughing are employed. By these operations the deeper regions of the soil are loosened, and will now admit of penetration by the roots of certain deep-rooted plants. At the same time the drainage of the surface soil is still further promoted and its wholesome porosity maintained. The most useful effect of these operations consists in furnishing the soil with a

new store of fertilising materials, which the lower portions of many descriptions contain, either belonging to them naturally or that have been washed into them by the continued action of rain and other agents which constantly tend to bury all materials added to the surface soil. The recovery of these buried treasures is still further assisted by the gradual mixture of the subsoil with the surface soil. . . . The striking effects often seen to follow the adoption of trenching and deep ploughing in increasing the produce—where the use of these operations had previously been unknown—may be traced principally to this cause. The valuable material removed from the surface soil during many generations is again brought into use, and acts with renewed vigor in promoting the growth of plants. Moreover, the deep layers of the soil that have hitherto remained undisturbed often contain valuable mineral constituents which, when mellowed by exposure to the atmosphere, greatly add to the fertility of the upper portions.”

On our own farms clay taken from dams has had a good effect when spread on the land. We have not been able to subsoil much of the land, owing to want of necessary motive power, but we are now adopting Professor Lowrie's plan of converting an ordinary stump-jump plough into a subsoiler. With it, only the surface soil is turned over, the share loosening up the subsoil to the desired depth. Crops on shallow cultivated soil, which look well whilst plenty of rain falls, generally wither off prematurely when an excessively dry period occurs. There is not the danger of this occurring when the land has been properly subsoiled, as land so treated has the capacity to hold and retain a much greater store of moisture to be drawn on in the summer months: neither is the surface of subsoil land so liable to become water-logged in winter. However, from results obtained from various plots subsoiled from time to time, we know that it will be beneficial. My father once had as much as 50 bush. of Cape oats per acre off a small paddock which had been subsoiled, without the application of manure. I think subsoiling should always be done as fallow.

Not enough care is taken in a great many cases in getting the proper tilth before the drill is put on the ground. We find that we invariably got the best results when we harrow the ground once or twice, and roll either before or immediately after the drill. The ground should be levelled with a chain harrow to finish.

In conversations with farmers generally I find that very few of them consider the residual or probable residual value of a manure at all when estimating its value. I know several who utterly condemned sugar refinery bone charcoal as useless on their land, because in a dry year they could see very little, if any, result. Thomas phosphate has also had a hard time of it from some, though with us it has invariably given satisfactory returns, and sometimes the second crop is as good or better than the first. This is especially noticeable where it was sown last year, the raw phosphates requiring somewhat more rain to dissolve them than the superphosphates. Generally speaking, the clover and grasses are three or four times better than they were before in our own paddocks. With regard to the clover, this plant is specially valuable as it is known to be a good collector of nitrogen. People often ask me, “Do I not think manures will exhaust the land?” This is a proposition which I consider most illogical. How could the application of a fertiliser to land impoverish it? If the land is impoverished—(which I have no doubt it will be) of its available supplies of potash and nitrogen, if a number of grain crops are taken off in succession—it is the crops so taken which impoverish. You desire the crop—the better the crop the better most people will be pleased, and of course the more phosphates, nitrogen, and potash will be taken out of the soil. You cannot have your cake and eat it. But in good farming practice one particular kind of crop is not grown continuously on the same ground, so as to exhaust it; a rotation is taken or the land is fallowed. It has occurred to me that a good rotation of manures would be thus:—After having the land fallowed in July or August, harrow down nice and level; then a little later on sow, say, 1 cwt. Thomas phosphate or 2 cwt. good bonedust with drill, taking care to kill all weeds; then when sowing the following May, *after rains*, sow small quantity of good bone superphosphate or mineral superphosphate with a little sulphate of ammonia added.

As for nitrogen, if we can get as good or better results from purely phosphatic manures, why buy and pay for the nitrogen? Of course it is different when the crop is intended for hay, when it would perhaps pay to apply nitrogen in some form. But I think that, in our climate, with a proper system of fallowing and rotation of crops, &c., it will not be necessary to expend any money on nitrogen directly. Besides, phosphate manuring will be found an indirect source of nitrogen. The phosphates encourage the nitrogen-collecting plants, such as clover, vetches, peas, &c., to grow. These plants are known, not only to collect it from the air, but, according to Dr. Aikman, Dr. Johnston, and other eminent scientists, they collect stores of nitrogen from the subsoil and bring it to the surface, where it is converted into organic nitrogen. Quantities of nitrogen are also brought down by the rains, especially by thunder showers, and these occurring in summer, and falling upon properly fallowed land, it would be enriched to a great extent. Nitrogen in this form in our comparatively dry climate will probably be found to be far better and cheaper than that artificially applied.

A great many farmers appear to think that there is some magic business about the manufacture of superphosphates. One was telling me that good superphosphate could be made

from common dirt, if it only had some of the "magic acid" mixed with it. Others appear to think that the sulphuric acid employed in reducing the insoluble phosphates (rendering it soluble and easily available for plant food) is the active manurial ingredient, whereas it really only has a negative value in most soils. If sulphuric acid is found wanting in the soil, we need not pay from £4 to £6 per ton for it. There are thousands of tons of gypsum on Yorke's Peninsula already in "sight" which could be calcined and sold at a very cheap rate. The fact that large quantities of gypsum are shipped from the Peninsula to be employed in mixing with superphosphates seems to be proof enough to some that they are doing the right thing in paying a high price to get it back again after it has been "treated." All the scientific authorities whose works I have consulted agree, however, that sulphuric acid is rarely or never deficient in ordinary soils. It is a fact that Thomas phosphate, which has given such excellent results, contains very little sulphuric acid. I am not at all sure but that a modified form of Jethro Tull's "Horse-hoeing Husbandry," which he practised as well as preached before any of us followed the plough, would be an improvement on the present method. He relied on a system of thorough cultivation of the growing crop, without the addition of any manures; he finally adopted the system of sowing his wheat in drills between 4ft. and 5ft. apart, cultivating the crop whilst growing. From what I have seen on other farms, and from experiments conducted by myself, I think it probably would be better to sow the cereal crops in drills 14in. or 16in. apart, also sowing the manure 7in. or 8in. apart; then with the modern appliances which we have in the way of cultivators the ground could be thoroughly cultivated one or more times whilst the crop was growing. This would have the effect of killing a lot of weeds, and also keeping the surface of the land loose. In case of a dry season such as last year, the plants would have more ground from which to draw their necessary supplies of moisture. I would like to see an exhaustive experiment made at Roseworthy College. Some years ago Mr. Jarrett, of Maitland, sowed a paddock in drills 16in. apart, and cultivated the crop one or more times. I saw this crop about October, and it looked very well indeed—in fact the best crop I saw in that neighborhood. I never heard particulars of how it yielded.

Other Crops.—We have grown good mustard on stubble land with the addition of a little phosphate when sowing. It will grow very well on the very poorest of limestone ridges. Mustard is the best thing I know of for fattening sheep. We find that mangels, turnips, peas, potatoes, all the sorghums, vines, fruit trees, and in fact every weed and cultivated plant, is specially benefited by the application of phosphates. Tons of melons to the acre may be grown on subsoiled land if it is phosphated; melons are valuable for feeding milch cows, also keeping poultry healthy in summer months; they scoop them out when a start is made for them by chopping a bit of the rind off them.

MR. CORRELL: Before I sit down I would like to say how much my brothers and I feel indebted to Professor Lowrie for the many excellent addresses he has given the farmers. The only thing I regret is that the farmers do not attend the meetings as they ought to do. Many farmers say, "Oh, he is a scientist," but from my knowledge of him I say that he is as practical a farmer as any of us, and with this advantage: that he has had a university education. If I have given you information which is of any value I am very happy to have been able to do so, because I think it is our duty as farmers to do what we can to help each other. (Hear, hear.)

Mr. Correll had on exhibition several samples of cereals and green fodders picked this season.

THE CHAIRMAN: I received a letter from Mr. Richard Bennier, of Port Broughton, respecting trials he made with kainit and Thomas phosphate. He applied 28lbs. of Thomas phosphate to a quarter of an acre and obtained 1 bush. 3lbs. of grain, while the average for his farm was less than a bushel per acre. Where used as a top dressing it gave no result. He saw no improvement whatever on either wheat or barley from the application of kainit. Then there is another matter in connection with superphosphate and Thomas phosphate which Mr. Correll has spoken about. It appears that some time ago remarks were circulated in Victoria that the phosphoric acid in Thomas phosphate acted quicker, and that it could be more easily used as a plant food than the phosphoric acid in superphosphate. This is not correct. The phosphoric acid in superphosphate, being soluble in water, is quickly dissolved by rain, and is at once a plant food; but through too heavy rains a large percentage of the phosphoric acid may be carried too deep into the soil, and, unless a very deep-rooted crop is growing, is lost to it. Again, in long periods of drought the

superphosphate may act positively injuriously on account of the sulphuric acid contained in it. The phosphoric acid in Thomas phosphate has quite different qualities. It is not soluble in water, and it cannot be lost through rain into the subsoil. The acids only from the roots dissolve it as they come into contact with the Thomas phosphate, and use it as plant food. Any portion not so absorbed remains therefore in the soil for future crops, and, as it contains no sulphuric acid, it is safe in either dry or wet seasons, and will act as a plant food at some time or other.

Mr. R. W. BAWDEN: I used Thomas phosphate largely, but the crop was a total failure. The crop looked much better till the dry weather set in, and then it went off in smut. (A Member: "Nothing to do with manures.") The rest of the wheat in the same paddock was free from smut. It was the same sort of wheat sown at the same time as the wheat with the manure.

Mr. J. W. DALL: I should be very sorry if Mr. Correll's paper was not referred to in some way. For a young man to write such a paper deserves our best recognition. Although we may not agree with all he has said, with many of his statements we must agree. The more we gather experience in the use of these fertilisers and the more we are enlightened by our good Professor, the better it will be for us. At Nantawarra we found the English phosphate was the best sort all round. Last year we examined some places that had been drilled with Thomas phosphate and superphosphate. The result was—I am speaking from memory—the drills without any manure yielded equal to $3\frac{1}{2}$ bush. per acre; with the Thomas phosphate, $6\frac{1}{2}$ bush.; and with the English superphosphate, $12\frac{1}{2}$ bush. The seed was sown about the same time.

Mr. CORRELL: How many years have you watched the land where the experiments were made?

Mr. DALL: We have very little knowledge of the use of the manures except during the last two years.

Mr. C. BELLING: I agree with what Mr. Dall has said. The two phosphates marked out the results stated, but the Thomas phosphate was as good as the other in a second crop. I quite indorse what has been said about the superphosphate draining away in wet land; we have had the water draining it away this year on land that was flooded. I think Professor Lowrie, in a lecture given here last year, said every farmer ought to have experimental plots for himself. That is what we ought to do. If the Thomas phosphate does well on the Peninsula it evidently does not do so well in my district. Last year the English superphosphate came off best. We want to run experimental plots in each district, so as to find what manure suits the place best.

Mr. J. MCCOLL: I feel indebted to the writer of the paper. We may not agree with some parts of it, but we must remember that the results of an experiment in one part of the colony may be different from those which will follow the same experiment in another part. As farmers we all ought to try experiments for ourselves, not only in manuring, but in cultivation. We know that the different soils in the different districts, the variations in rainfall, and other differences in the season have an effect upon the growing crops, and by trying various experiments, fallowing early and late, and attention to cultivation, we find out how the best and most profitable crop can be grown. Our object is always to grow a good average crop on a certain quantity of land, rather than to cultivate a large quantity and get a poor crop. When we have a fair rainfall I think we should increase our average by good cultivation and by early fallowing. I know from experience that early fallowing, working the land well, and getting it clean, will give much better results than later fallowing. In our district we have had three or four years of drought, and the feed has been short and stunted. People have not been able to work the land as they would like, but wherever they can they should give the land the best cultivation possible.

I am not able to speak from experience with regard to manuring excepting with a small quantity of manures which I had the year before last. I had some kainit and Thomas phosphate. The latter was used late in the season as a top dressing. There was no perceptible difference last year, but that may be due to the fact that the soil is naturally rich. Many of the fallow crops this year are already 2ft. high, and the late rains have made them so rank that they have fallen over. I think we have to find out for ourselves which is the best manure to use.

Mr. GREGORY: Mr. Correll says he is sometimes asked whether he does not think manuring will exhaust the land. I think the question with most farmers is not whether a fertiliser will exhaust the land, but whether these artificial manures are fertilisers or merely stimulants. Fertilisers must do good—there is no doubt about that; and the experiments with Thomas phosphate and English superphosphate, in our district, have so far given wonderful results. But the question is are they fertilisers or stimulants?

Mr. LEHMANN: Some years ago I tried experiments with the most important manures—Thomas phosphate, English superphosphate, colonial superphosphate, and Kangaroo Island guano. I do not quite agree with Mr. Correll in regard to Thomas phosphate. This year I have tried the different manures again. I have filled kerosene tins with earth, and used 4ozs. of manure and four grains of wheat to each. The results have been:—With no manure, twelve stems of wheat; Thomas phosphate, thirteen stems; English superphosphate, fourteen stems; and colonial superphosphates, thirty-six stems. This year I found that the other three manures mentioned ran through the drill at about the same rate, but the Thomas phosphate went through twice as fast as either of them, and now I see a red streak where it fell. I would rather have a quick-acting manure than a slow one. This is at Murray Bridge, and I think the land there is very much like that on the Peninsula. It is a red sandy soil with limestone. Last year I got Mr. Norman to drill in ten acres for me. I broadcasted 1½ bush. of wheat on limestone soil with 1½ cwt. of Thomas phosphate, and cut 1 ton of hay. I broadcasted 2 cwt. of English phosphate on sandy soil that was so completely exhausted that it would not grow any grass. I ploughed in the manure with the seed, and I reaped 16 bush. to the acre. There had been a lot of stinkweed on it before, but in the summer, after the crop was reaped, not a stinkweed plant could be seen; and now I have the finest crop of grass on that land that can be seen on the farm. As to exhausting the soil, no doubt the ground will be quickly exhausted if strong crops are grown, but if we continue manuring I think it will be all right, and no harm will be done.

The CHAIRMAN: I can hardly understand how anyone can think that a fertiliser can exhaust the soil, because you are giving the plant the food that it requires. How then can it possibly exhaust the soil? We can give the land the three different kinds of plant food that it needs, and by doing so the soil cannot be exhausted.

Mr. HARKNESS: There is, I think, a very general idea among farmers that these artificial manures are simply stimulants, and I saw a letter in the paper from no less an authority than a university professor in which he almost said the same thing. I cannot understand that statement. We know very well that if whisky is regularly administered to a child he will grow up stunted and the stimulant will retard his development, but the very opposite is the case with these artificial manures. From the very first the plants grow strong and healthy, and therefore I cannot believe for a moment that the manures are other than real food to the plant. Of course the soil will become exhausted unless we keep on giving it food. Now it is gone abroad that our friend Professor Lowrie has also said that these manures are stimulants. I would like to hear from him something about it, because it is well that we should

have facts before us and know what the Professor is doing at Roseworthy. I would just give a little of my own and my neighbor's experience with regard to some of these manures. It is very evident that broadcasting the manure on the land has very little immediate effect. A neighbor of mine who had some superphosphate left over put four bags on eight acres and sowed it broadcast; he also had a few acres which he drilled in, giving it only 60lbs. or 80lbs. of superphosphate per acre. The crop on the portion broadcasted does not look half as good as that on the drilled land, so I think top dressing as a rule will be found inferior to drilling. I was very pleased to hear what Mr. Correll had done. In one thing I disagree with him, and that is in regard to deep cultivation. I dare say many of you will remember that when Professor Custance began his work at Roseworthy he was a great advocate of deep cultivation. He got a steam plough and a scarifier and cultivated the land something like 16in. deep. Of course everybody was anxious to hear the result of the experiment, but, as far as I can remember, it was a failure. Practical experience has shown us, I think, that deep cultivation, as a rule, does not answer for wheat, and I have considerable knowledge of what other people have done in the matter.

A DELEGATE: I find Mr. Correll recommends the spreading of clay from dams over the surface of land. I would like to know if that is generally recommended?

The CHAIRMAN: It must depend entirely on the particular kind of soil.

Mr. CORRELL: I only advocated it for land like my own. Some clay may be injurious. The clay we have spread on the land comes from our own dams, and has benefited the land in every instance where it has been used; but I understand that such a practice at Tiparra has had an injurious effect.

A DELEGATE: A neighbor up my way has got a crop by using phosphate, when previously he could get nothing.

Another DELEGATE: Would Mr. Correll continue using superphosphate with wheat for two or three years running?

Mr. CORRELL: We have not done so. In the first year we sowed wheat on fallowed land; the second year we had four bags of oats to the acre; and this year promises to give us considerably more than four bags of oats from a self-sown crop. A lot of native clover is growing in the feed on the manured land. I do not think such is likely to injure the land.

The CHAIRMAN: I would not advise the use of clay everywhere. I know of clay having been spread on the sand bank with the result that more harm than good was done.

Mr. LEHMANN: I used clay once with very good effect, but it was taken from underneath an old pigsty. (Laughter.) If I took it from underneath a sandhill I should not expect the same results.

A DELEGATE: I would like to know what Mr. Correll has to say about the use of guanos. It seems to me there is a vast difference between deep ploughing and subsoiling. The former brings up and turns over the cold soil, whereas subsoiling merely stirs it, and opens it up underneath.

Mr. HARKNESS: Professor Custance simply cultivated it.

Mr. CORRELL: I have just stated facts as gathered from our own experience. If you get good phosphoric guanos they answer well, I believe.

A MEMBER: I do not see how phosphatic manures can impoverish the soil, seeing that they enrich it and bring out its best properties. I have tried subsoiling several times, but observed no good effects, and I came to the conclusion that the soil did not require it. What may suit one kind of land for subsoiling may not suit another, I did not turn the subsoil over, but loosened it in the furrow by running a wide share on the front plough.

Mr. HUTCHINSON: May we not find that the use of the same sort of manure

will after a few years exhaust the soil and make it necessary that a different kind of manure should be used?

The CHAIRMAN: If you always employ the same fertiliser it is quite likely you will exhaust the other plant foods. Professor Liebig has shown that it is always the smallest amount of plant food which gives you the result. If you have not a sufficiency of all three constituents you cannot expect a full crop.

Mr. H. A. DAVIS (Riverton): I have listened with great pleasure to Mr. Correll's paper, and also to the discussion, and do not like letting the meeting pass without recording my little experience. Some three years ago I began manuring on a rather small scale, because it was a new and expensive thing. I put in 100 acres, on which I scattered 1cwt. of bonedust per acre broadcast. From that I cut 35cwt. of hay per acre, although the season was a dry one. In a fallowed paddock alongside I sowed sixty acres broadcast, without manure, and as there was a drill in the district—the first drill I had seen—I used it to drill in twenty acres. I used 80lbs. of Thomas phosphate per acre, with the result that I got an average of 30cwt. of hay per acre from that twenty acres. I estimated that if I had cut it for wheat I should have had 27bush. to the acre. The sixty acres without manure returned me 7½cwt. to the acre. I got £33 more from the twenty acres with the phosphates than from the remaining sixty acres without the manure in the same paddock. Last year I tried various manures. Thomas phosphate and super-guano gave about equal returns, but bone phosphate was far behind these other two. On the twenty acres I have spoken of I put no manure at all, because I wanted to see if there would be any result the second year, and I could scarcely see any difference between it and the other portion of the paddock which was then manured. The eighty acres last year gave me an average of 30cwt. to the acre. I had the same paddock sown with oats, and it is promising to return me 2 tons to the acre. I may state that at Riverton we have patches of nearly all kinds of land—sandy and loamy land, limestone patches, black land, and very cold clay land. I could take you to one paddock of fifteen acres that never before averaged more than 2bush. or 3bush., and from all appearance now I should think it would yield from 20bush. to 23bush. It belongs to Mr. Hogan, of Tarlee. He treated it with 50lbs. of Thomas phosphate and 50lbs. of sheep manure per acre, mixed together.

Professor LOWRIE: I join with others present in saying we are grateful to the Correll Bros for the care they take in placing the results of their experiments before their fellow farmers. It has been said once or twice to-night that the kind of manure or the quantity of it which will be found suitable in one district will not possibly be so suitable in another. There is nothing truer than that. However, it is well I think that we should get the benefit of the experience of those who are working in districts different to our own, because, although we may not have the same definite results, their experience may shed a light on some of the problems we have to deal with. From that point of view I am indebted to Correll Bros. Various questions have arisen to-night. The one referred to by Mr. Harkness and Mr. Gregory is exercising the minds of farmers considerably—whether or not the recurrent use of phosphatic manures is likely to exhaust the soils treated. I have had letters time after time asking me about this matter, and informing me what opinions are abroad among the farmers. Our Chairman, I think, put the question as fairly as it could be put. If we are treating the land with artificial manures and using only one of the elements likely to become deficient, and by that one are encouraging the plant to increased growth, it is likely to take more of the other two elements out of the soil. In that sense the manure that has only the one ingredient in it can be said to be exhaustive; but "exhaustive," used in the proper sense of the term, is not to be applied in the case. If we have continued for a number of years with the phosphatic manure alone we may bring about a condition of

things in which we have an excess of phosphoric acid and a slight deficiency of nitrogen or potash, but the deficiency can be easily overcome. The matter is under our own control, and it is for us to read our paddocks with an intelligent eye, and as carefully as we may to find out how far we may go in a particular line, and how best we can blend manures. I have found that in this colony it is the phosphatic manures that give the best response, as Mr. Correll has pointed out, and I believe nearly everybody has found the same thing. As definitely as I have been able I have sought to give the explanation. First, there is the prevailing practice of wheat-growing, which gives the most profitable crop. Wheat is more exhaustive of phosphoric acid than a rotation of crops would be. We have been following a practice which has been exhausting the phosphoric acid in the soil. Of course when we begin to use manures we want a manure that supplies the substance upon which we have made the greatest drain, and when it is in the soil we get the best response. A member has asked if we cannot have the benefit of British experience. Well, we have it before us every day. We get full information regarding the work of the English Agricultural Society, the Scottish Society, and the American societies, and we find definitely stated what the experience is with manures in their countries. You will find the best results for cereal crops attend the use of phosphatic manures and some nitrogenous manures. At Rothamstead they have taken off a crop of wheat every year for over fifty years, and have averaged something like 45 bush. to 47 bush. per acre. Of course the land was fully manured. (Hear, hear.) Surely after that we need not fear the risk of manures being stimulants or exhaustive to the soil. I hope the members of this Congress who may take the opportunity of coming to the college on Monday will give attention to a paddock from which we have obtained three crops of wheat in four years. It has this year carried over a sheep to the acre since the season opened, and I have taken the sheep out of it with the intention of putting in the mower and cutting it for silage. It affords evidence of the fact that the manure used in the place has not exhausted the land, but made it a great deal better than ever. Nitrate of soda and sulphate of ammonia are recognised to be stimulants. Phosphoric acid in a sense may be said to be a stimulant, that is, when we have a sufficiency of it in the ground the plant can continue its vital functions to a longer degree of existence against adverse physical conditions. It would continue to grow during a spell of drought when a plant not having this excess of phosphoric acid could not grow at all. The manured plant keeps on growing much more markedly than that which is unmanured. In that sense it is a stimulant, but it is also a direct food. Now, it is possible by using nitrogenous manures to over-stimulate a crop. We get the crops so broad in the flag and strong in the stem that when the hot season comes it blights it; so if we use nitrogenous manures at all we must do so in small quantities. We do not require to use anything like the same relative quantities of nitrogen that is needed in a wetter climate like that of Britain. Our soils that are fallowed recover more nitrogen than the soils of countries where the rainfall is heavy. We have no under-drainage, or relatively little, so there is little or no loss in that way. I am doubtful about the superphosphate being washed into the subsoil. It might be so in the South-East, but even there very slightly, I think. I know districts in Britain where the rainfall is upwards of 50 in., and the water overflows from the underground drainage, and when analysed has shown but faint traces of phosphoric acid, although as much as 7 cwt. of super. per acre has been applied. I would be right glad to have the phosphoric acid somewhere in the land, at any rate. However soluble it may be, I think there is very little chance of its being lost in this climate. When you apply superphosphate to the land it is soluble in water, but a fortnight later chemical changes have taken place which render it insoluble in water,

and three months later you might find it as insoluble as it was before treated with sulphuric acid. I strongly recommend for this dry climate the use of the most soluble phosphatic manures you can get. If it is found that Thomas phosphate or any other manure gives better results on certain kinds of land than mineral or bone superphosphate, by all means hold to it. It may be that on the colder parts of the country around Minlaton and further up the Peninsula, where the soil is decidedly cold, the quicklime in the Thomas phosphate goes better than on other soils. On some of the strong land up Riverton way I have been told that farmers get better results with that manure, but I think as a general rule you will find it better to use bone or mineral superphosphate, though you have to give a higher price for it. We wish to have it as soluble as possible, in order that with our light rainfall we may be enabled to make use of it. (A Member—What about green bonedust?) It is a question of price. A longer time would be required to get it into use in the land, but you will apply in that case 3 or 4 or 5 per cent. of nitrogen, and thereby put back the day when the soil will be exhausted of its nitrogen. (A Member—Some of the vendors say they are selling Professor Lawes' superphosphate.) I know that Sir John Lawes has done more for agriculture than any man who has ever lived, and not satisfied with what he is able to do in his lifetime he has given £100,000 to defray the cost of continuing the experiments which he carried on for many years. He made the money out of artificial manures. He began experiments to find out what was the best course for his own business. He was successful in getting a trade, and then the experiments went on. You may get better superphosphates, or you may get worse, but in buying from this firm you know that you are dealing with an old-established and reliable firm. Mr. Correll mentioned how important it was to harrow well before drilling. I thoroughly agree with him in that matter. I do not like his idea of levelling with the chain harrow after the drilling. My experience favors getting the land as you want it first, and then leave it alone. As to deep cultivation, our fathers knew as much as we do, and their rule was that shallow cultivation immediately for wheat gave the best results. I do not say a man should always cultivate his farm shallow. I think we should take the chance of deepening. If you do it too late in the season you get it so loose that the wheat will not thrive. But all the same I would support Mr. Correll in saying that it is desirable for us to get our soil deeper, even although the first crop we get is not so good as with a thinner soil, because it will work back on the land in after years, and you are increasing the feeding ground for the plant. If you have a year like this one you will find that the deeply cultivated ground is doing best. I have a piece of land that I worked with fallowing last year somewhere about 8 in. deep. It was partly ploughed, torn about, and all knocked off the top of the fallow in a very irregular ugly-looking way, and the raw red subsoil would work up to the top. I was afraid I would get a smaller crop from it this year. Well, I have crop on that which is, I think, the best I have ever had on it, and equally good with the crops on any other part of the farm. I know too that two years hence the land will be all the better for the deep fallowing it had this season. I say let us work our soils deeper, and make them mellowed. Let us fallow and provide the manures that the soils want. (Hear, hear.)

MR. CORRELL: I must thank the members for what has been said about my paper. A man with greater experience would have done better, but I have done my best. Although only a young man, I have been observant. My father was one of the best farmers of his time, and I have endeavored to go forward and not go backward or stand still. There has been some disagreement with a few of my remarks, but I think on the whole you have fairly well agreed with what I said. A great deal has been said about the manures being

only stimulants, but that argument has been well replied to, and it has been pointed out that you are only putting into the soil that which you find by experiment the soil is deficient in. With regard to exhausting the soil, I looked up a considerable number of works on English agriculture, and was satisfied there could be no exhaustion so long as the manuring is continued properly. As far as I can see, phosphate is one of the things that have to be applied in growing grain crops in any country. Some people, I think, too quickly condemn slowly acting manures. Take last year. A man using bone-dust then would get the benefit this season, while superphosphate, of course, would have a better show in a dry season like that of last year. I am sorry if I have written anything that has been acted upon by any farmer to his detriment. With regard to broadcasting manures, I think if you had a failure one year you would get some of the benefit in the following year. Of course if the manure is dropped in with the grain the plant gets a better start. I think, with the professor, that it would be well to get a greater quantity of phosphates into the land. I should be pleased to show anyone the land with which I am acquainted on the Peninsula, and to tell them how it has been treated. (Hear, hear.)

THURSDAY MORNING SESSION.

Pruning Fruit Trees.

Mr. G. QUINN gave the following address:—

The subject of pruning fruit trees is of a character far too comprehensive and important to be treated with due justice within the pages of this short paper. I shall therefore make no attempt to deal with the subject generally, but merely ask your attention on some points of interest connected with the pruning of a few sorts of fruits that are known and cultivated in nearly every fruit garden in temperate South Australia.

Although the ultimate object kept in mind when pruning fruit trees is to produce earlier and more regular crops of fruit of superior quality, it can only be claimed that this is the final chapter in the study of orchard economics as illustrated in this practice. Before we can achieve these final results we must have a suitable tree which observation and accumulated experience has taught will yield these desired results when treated in a certain manner.

From the time when a virgin fruit tree is taken from the nursery bed and planted into its permanent position in the orchard it enforces the need for treatment as a separate individual, as no two trees grow exactly alike in every particular. I may go further than this, and say that every branch of a tree is a separate individual, as far as pruning is concerned, and, like the human individual in civilised society, must be made to conform to rules which ensure the proper liberties of its neighbors to be safe-guarded. Notwithstanding this, an ideal type should be firmly set in the mind of the pruner, and the individual characteristics of each tree must be studied with a view of attaining this ideal as nearly as possible.

To obtain the best results the pruner must treat the young tree in its initial stages of growth with as much accuracy as the engineer employs in the creation of any mechanical structure. For this reason it may be argued that the first pruning which the yet unshapen fruit tree receives must be of the greatest importance.

The primary step in following a given type or form is the setting of a stem. It would not be prudent to allow one's trees to spread upon the ground, and to avoid this we must cause a stem to thicken which will possess strength sufficient to bear branches, upon which in turn crops will be carried both of fruit and foliage. With this end in view we sever the principal shoot of the young tree, and by this cut settle for all time a definite length of stem. Upon the judicious application of this first pruning depends the height from the ground at which the main branches shall start, and for all practical purposes it settles approximately the height from the ground at which the fruit shall be borne when the tree reaches its full carrying capacity.

In connection with the production of fruit upon economic lines a great deal hinges upon the height given to this main stem. The convenience or otherwise with which the fruit may be harvested, the trees pruned or treated for diseases, the shading of the ground above the root system during midsummer, facilities for working the soil, and the power of resisting boisterous winds are some points for consideration therewith.

After weighing the advantages there exists in my mind no doubt that for the conditions ruling in South Australia nearly everything is in favor of the short-stemmed sturdy vase or

goblet-shaped tree. In the pruning, therefore, of the apricot, peach, nectarine, plum, apple, cherry, pear, and quince in the initial stages, very little difference is noted. Allow me to repeat that at this stage the pruning is done for the purpose of shaping the tree; consequently all the energies of the young tree should be directed to promote vegetation, as the production of fruit at this stage is not considered. The virgin tree is cut back to a stem from 15in. to 20in. in height, and from the uppermost buds a number of branches will grow. Some pruners prefer selecting four; personally I favor three, as I imagine in the subsequent divisions more room is allowed for the development of lateral or fruit spur growths. In the location of these branches along the main stem, equal angles of radiation from the stem should be sought, and to still strengthen the main arms and insure the tree against the possible loss of one or more by splitting off, these branches or rudimentary main arms should be distributed as widely from each other along the stem as practicable. This can usually be attained by rubbing out completely or pinching off the points of the intermediate buds to the advantage of those most desired. These desirable shoots are encouraged, but frequently it will be found one or more of these outstrips the others greatly. To checkmate this the young tips may be pinched out of these extra strong shoots, and thus temporarily check them to the advantage of their slower neighbors. This should not be done unless the differences of growth are becoming very irregular, for, as before stated, the full vigor of vegetation should be encouraged. These operations come under the head of spring or summer pruning to promote shape in the tree. The following winter the second pruning will be given, when the main shoots will be cut back to short spurs, each carrying a very few buds. The reason for leaving a few buds is to concentrate the whole growing energies into a few branches, and thus make them stronger individually than would be possible if a great number were left. For this reason a weak shoot should be allowed to retain a lesser number of buds than a strong one.

This fact is generally ignored, and many pruners follow an exactly opposite rule. Should they meet a shoot weaker than its fellows they take compassion and leave it as long, with the result that in the following season the weak one falls further into the rear in the race for equality. The young tree is now provided with a stem, three main branches radiating from that stem, and several shoots from each main branch. Of these we select two on each that are radiating again in suitable positions to continue the circle. Should more grow they are pinched back from time to time to check them off into fruit spurs for the future; but in most cases I am of opinion that beyond the main shoots no spurs should be permitted to grow at all at this stage; but this is only a matter which can be decided upon each tree individually, the restriction or suppression of spurs depending upon the strength of growth exhibited by the tree generally, or the necessity for shading the bark, as in the cherry.

When the third winter pruning is given the shoots of the previous season's growth are again cut back to a few buds. The two at the top near the cut section, which are to continue and maintain the shape of the tree, should point in such directions as will most effectually fill up vacant space in the completion of the still widening circle made by the crown of the tree. The foundation of a strong, regularly shaped tree having now been laid, the future work of pruning will, whilst directing the growth and maintaining the general equilibrium of the tree, be mainly turned in the direction of developing its fruit-bearing properties.

A common argument against such pruning is that the unpruned tree gives an earlier return. This I do not deny, but assert that it is a policy equivalent to "killing the goose that laid the golden egg," inasmuch that these fruits are borne upon the uppermost branches, thus assuring the non-development of the lower buds into laterals, which are so important as fruit producers, and with such fruits as the peach or nectarine these lower buds invariably die out as the result of permitting early fruitage higher up.

The system advocated herein ensures that nearly every bud left upon the limbs after each winter's pruning will start into useful growth, becoming either an immediate fruit-bearing lateral spur, or a leading growth to continue the development of the tree. Such a system of gradually building up a strong tree forbids the possibility of fruit being borne upon the extremities of the branches before they are strong enough to bear its weight.

Having laid the foundation of the future tree by a rule which, with a few modifications, applies to all deciduous fruit trees, we have now arrived at that stage when the treatment is mainly directed to the encouragement of the fruit-producing capabilities of the tree, and here a wide diversification begins.

For the sake of brevity it is assumed that all are familiar with the differences between fruit, or more correctly flower, buds and wood or growing buds. A knowledge of these is of primary importance, and without it the pruner is groping in the dark. Having acquired the knowledge of distinguishing between these two classes of buds, the next step is to observe upon which growths of the tree the bloom-producing buds are borne. Having acquired a clear grasp of these essentials the pruner is equipped for a further step in advance.

It is upon this last-named characteristic that a classification is based for practical purposes. Such classification is as follows:—

1. Those trees bearing fruit buds upon shoots one year old only. Illustrated in the peach and nectarine.

- ii. Those sorts bearing fruit buds upon one-year-old shoots, but chiefly and preferably upon shoots two or more years old, such as the apricot, plum, and cherry.
- iii. The kinds bearing fruit buds upon wood three or more years old, as represented by the apple and pear.

In pruning those of the first section the pruner has to constantly bear in mind that while a desirable number of flower buds are retained to carry fruit during the following summer, a certain number of growing buds must be forced to produce shoots upon which flower buds will be matured during that same summer. This assures a crop of fruit buds for the following year's crop. This will be more readily understood when one recalls a peach or nectarine tree which has not been pruned. Such a tree rarely bears two heavy crops of fruit in successive seasons, simply because nearly the whole of its energies during the cropping year are devoted to fruit production, and very few properly nourished flower buds are produced for next year's crop. This is why we claim that proper pruning gives *regular* crops of fruit. The fact that upon shoots of the previous year only flower buds are borne upon the peach has led many to overlook the need for renewing by judicious pruning the laterals which grow out from the main arms, and thus retain the fruiting wood low down upon the tree. Consequently after these laterals have borne one crop they are either allowed to die or are cut away before they are dead; consequently the fruit-bearing shoots are encouraged on the terminal divisions of the main arms, where it is most exposed to climatic injuries and costly to gather.

If a lateral of the peach be examined it will be found to carry a pair of growing buds at the base. The flower buds are usually in pairs, and between them a small flat growing bud is usually located. Following along the shoot, small flat pointed growing buds are found singly. It is over one of these the shoot should be shortened in; although on a young and vigorous tree the small growing buds located between the pairs of flower buds will frequently grow, they are not reliable on most trees and should be avoided. Should single wood buds not be available it will be found advisable to cut a fair proportion of the laterals back to these base buds. When this is done and both buds give rise to a shoot spring or summer manipulation is necessary in the direction of rubbing off some to prevent crowding. Some varieties of peaches produce flower buds near the terminal points only of the laterals, and this characteristic, as far as our present knowledge goes, cannot be completely altered, but it can be checkmated by the above-mentioned process of severely shortening a fair number to force new lateral growth, while others are left almost entirely unpruned to carry fruit. It should be remembered in pruning these trees that only a percentage of the buds are fertile, and each bud can only produce one fruit.

In considering the second class, viz., the apricot, cherry, and plum, as mentioned previously these will sometimes bear fruit upon one-year-old shoots, but the majority of experienced growers prefer to encourage the retention and the gradual lengthening year by year of the lateral spurs. Upon these are borne the best average fruits, and certainly fruits growing upon such spurs are most secure. In the formation of these spurs the apricot has a characteristic in strong contrast to the plum and cherry. When a strong shoot, say a couple of feet in length, of the previous year's growth is left upon the two latter sorts at the winter's pruning almost every bud along that space will grow into a lateral shoot, but with the apricot it is rarely safe to leave more than one foot of growth when pruning in winter, for the reason that many buds near the junction with the two-year-old wood will remain dormant.

Therefore in pruning the fruit trees of this section provision should be made for leading shoots which are to maintain and continue the development of the tree, and only such a number of buds should be left below these as the pruner is assured will grow out into useful spurs. If an apricot spur be examined it will be seen that the flower buds are arranged in pairs—sometimes in triple clusters—and usually a wood bud is secreted between them, as with the peach. Growing buds may generally be detected singly upon the laterals. The terminal bud is always a growing bud. Unlike the peach, the growing buds at the base are badly developed and frequently unreliable. In practice, should no growing bud besides the terminal one be found upon a spur, it is usually safest to refrain from cutting the spur back. Although, as with the peach, young vigorous trees will force growths from the weakly developed wood buds situated between the pairs of fruit buds, it is not advisable to rely upon such buds upon mature trees. When some spurs are left untouched for the above reasons others should, where wood buds are available, be shortened back close to induce branching laterals to fill the space which will probably be left sooner or later by the unpruned shoot. It has been proved by actual practice in the climate of South Australia, on trees of medium vigor at any rate, that indiscriminate shortening over flower buds is a direct cause of the premature dying out of large numbers of the fruit spurs upon apricot trees.

Coming to the third section, viz., the apple and pear, which bear their fruits on growths three or more years old, we touch a class of trees the pruning of which is either much neglected or greatly misunderstood in this colony. In suitable soils and under favorable conditions of climate the apple and pear during the first few years after planting make long vigorous growths. If these growths are cut back severely in winter the buds left give rise to a great many strong straight laterals besides the few leading shoots. Persisting in this form of

winter pruning only intensifies and increases the numbers of these laterals until the trees are like a carpet broom. This may go on for years and no fruits are formed, for the simple reason that the flower buds which would form on the terminal points are cut away year by year and the trees' energies directed to woody growths. It is this inevitable result which leads one to the opinion that it is the chief cause why apple and pear trees are so frequently unpruned. When an apple or pear tree is left unpruned it usually makes only a few lengthy erect growths upon the tops of which fruit buds gradually form. A few fruits are borne on these terminals first, and these long shoots having grown rapidly are not stout, and quite unable to resist any strain in the direction of bearing up a weight, consequently these few fruits, although in themselves only a few pounds in weight, bring a strong leverage pressure to bear, and the shoots carrying them are borne towards a horizontal position. Under the rule that bending or twisting a shoot out of a vertical line checks the flow of sap to its summit, and gives a decided stimulus to those buds now raised towards the highest plane, these buds at once break into growths which, according to the degree of advantage gained, are either laterals or leading shoots. It will be claimed this allows an earlier yield of fruit, but it by no means assures that all, or anything like all, the buds are utilised, and the tree becomes an almost hopeless wreck as far as systematic pruning, equal distribution of the fruit, or shaping to accommodate the economic working of the ground is concerned.

It is for the purpose of establishing a regularly-framed, sturdy tree that the rule suggested in the early part of this paper are devised, and the difficulty of increasing laterals arising from the necessarily hard winter prunings while the tree is vigorous may by a simple process of late summer manipulation be turned into a profitable channel. The process referred to simply transforms a rank-growing lateral into a fruit-bearing spur. When growth has practically ceased in summer these laterals are broken over a knife blade about three parts of the way through, leaving not more than two buds upon the stump left upon the tree. The portion of the twig which is broken off is allowed to hang to take a portion of the sap, which now only flows stagnantly. The tree attempts to replace the broken member by starting the buds left upon the stump. Should the fracture or section be clean and complete, or made too early, or a fall of rain cause fresh vigor to be diffused through the tree, a long shoot may again arise; but under normal conditions only swollen spurs will form from the buds upon the stump. These in a couple of seasons will carry fruit. In the following winter the hanging twig is pruned away. Should the contingencies mentioned above arise the long shoot should be either broken again or pruned in the following winter back to a base bud upon the first spur.

On old apple or pear trees it will be noticed there is a tendency to form an excessive number of fruit spurs, from the simple fact that usually a fruit bud bears at its base two growing buds, and when flowers have been borne frequently both the buds shoot out into spurs. To overcome this difficulty and to obtain first-class fruits each year's winter pruning should suppress a great number of these, always giving preference to the retention of those set nearest to the main sources of sap supply.

By means of the blackboard Mr. Quinn illustrated his remarks, showing in a very lucid manner how the tree is formed, how to induce the development of fruit buds, &c.

MR. J. CORRELL: I should like to say that I have listened to the address by Mr. Quinn with a great deal of profit. I agree with him entirely in the matter of pruning peach trees. I have had only a little experience, still it is extended over a number of years. The peach trees which I have been in the habit of pruning are bearing fruit right down to the butt. I should like to ask if Mr. Quinn is in favor of pruning an apple tree down to within 6in. of the ground in large orchards; say trees planted 25ft. apart.

MR. QUINN: For most kinds of apples that is rather too near the ground. I would prefer the limbs not to come within 1ft. of the ground.

MR. W. C. GRASBY: I understand it would make a material difference if they were planted 25ft. apart whether you would have a 6in. stem.

MR. CORRELL: It makes little difference.

MR. GRASBY: If I were planting 25ft. apart I would not train them so low. I think 25ft. apart is a most important matter in this connection.

MR. T. PRICE, M.P.: I would like to be guided in a matter. Take peach trees which have been attacked by aphid, and the centre has been cleared by the disease. What means would you adopt to bring about the inner growth of that tree once more in the way of pruning, because you do not want to destroy the tree if destruction can be avoided?

Mr. QUINN: Without severely cutting the tree I cannot see how you can fill up the lower parts with fruit-bearing wood.

Mr. BADMAN: Mr. Quinn has ably demonstrated on the blackboard the pruning of different trees. I find a peach tree is one of the most difficult to prune, because you are very apt to cut away fruit-bearing spurs and leave the tree nude of blossom.

Mr. J. W. DALL: I should like to ask what Mr. Quinn would do in the case of a peach tree which has been neglected and got full of thin wood. The tree has been summer pruned, and shot out until it was all branches from the stem right up.

Mr. QUINN: If all those thin pieces of wood are healthy I would prune the tree very carefully in the winter time, not caring so much for the fruit for that season as for getting the tree in good condition. If the shoots are too numerous distribute the number along the branches, and when the growth comes again in the summer go in for rubbing out.

Mr. DALL: The danger seems to be that there is so much top on the tree that it will kill it.

Mr. QUINN: I cannot understand how it would kill the tree if the growth is healthy.

Mr. DALL: At Nantawarra we find that unless a tree is well cut out the growth will kill it. I went into a neighbor's orchard the other day and the tops of trees were full of thin growth.

Mr. QUINN: If these lateral shoots are too numerous, thin them out. Distribute those remaining nicely along the branches. Of course you can take a lot of them out, but not take them out entirely.

Mr. ROGERS: I would like to ask Mr. Quinn as to whether dead spurs or bearing spurs of this year should be cut off close or left a little distance from the main branch. Where I have cut the spurs closely no other shoots come, but where I have left some little distance very frequently two spurs would grow where the dead one was cut off.

Mr. QUINN: With respect to the treatment of the spurs of the apricot I thought I had made it clear in my remarks that anyone cutting off should look for the wood bud. If the spur is not strong it would probably die out. If you cut indiscriminately you would probably cut it over the flower buds. The reason why you leave a little spur is probably this, that there are buds at the base where the lateral is inserted into the main shoot, and by leaving it a certain length you do not interfere with the wood buds, and they grow.

Mr. SEARLE: I notice in many parts of the colony that many of the branches die. I have a tree, and nearly every branch or part of the branch is dying. What would Mr. Quinn do in the case of such a tree? This tree bore about a case of apricots last year, and I considered it would be in a flourishing state this year.

Mr. QUINN: What is the district?

Mr. SEARLE: Arden Vale, in the ranges, near Quorn. We had a flood over the land last year.

Mr. QUINN: I should be inclined to think that dead branches here and there would be the result of the drought. Of course, it does not follow that flood water runs into the ground. If the limbs look sickly, say about the parts where the shoots are dying, I should cut right below the dead growth. You would certainly do no harm, and probably you would do a great deal of good.

Mr. SEARLE: Would it be injuring the tree to do it now?

Mr. QUINN: I do not think so.

Mr. NOLL: I come from the same district as Mr. Searle. I have apricots which I cut down very severely, taking away the tops, and now they are breaking out and are full of new growth. I believe that we shall have any amount of new wood.

Mr. BAWDEN : In my garden I have pear, apple, and quince trees something like thirteen years old, and up to the present they show no signs of bearing fruit.

Mr. QUINN : What have you done to them ?

Mr. BAWDEN : Last year they were pruned back very hard.

Mr. QUINN : What was the result of the hard pruning ?

Mr. BAWDEN : They appeared to look healthy enough. I am speaking of the Port Broughton district.

Mr. QUINN : Was the growth from the hard pruning very strong ?

Mr. BAWDEN : Fairly strong.

Mr. QUINN : Well, if I had trees that did not bear for such a long period I would get some good scions from a good tree and graft them, or root them up and burn them.

Mr. DALL : Invariably trees die off in our district when they are expected to be in full bearing. How is that to be accounted for ?

Mr. ROGERS : I should like at this stage to move a resolution, Mr. Chairman. We have a large number of gentlemen here from the country districts, and judging from the questions asked this morning, I am convinced that the resolution will be carried without opposition. I move—"That, in the opinion of this Congress, the services of the Inspector of Fruit should be more largely utilised in the country districts, and, with this end in view, the Minister of Agriculture be asked to appoint additional inspectors to inspect imported fruit and relieve him of this work." (Applause.) For the last two years in travelling about I have found questions continually arising with respect to the pruning of fruit trees, particularly the apricot and peach, the two trees mostly growing in the North. The lack of knowledge concerning the proper treatment of trees could be met by Mr. Quinn being relieved of his duties in Adelaide to enable him to visit the country districts and lecture. This morning I looked around and saw a large number like myself who are growing grey. Our boys must turn out to take our places soon. But, as we cannot bring our boys to attend the Agricultural Bureau Congress in the city, I think that the Government should allow the Inspector of Fruit to travel and lecture to us and our boys. (Applause.) I hope that the resolution will be carried, and that the Minister of Agriculture will soon see his way to give effect to it. (Applause.)

Mr. SEARLE : I have very much pleasure in seconding this motion. We in the country districts have not been brought up in orchards, and so we have a good deal to learn in this branch of industry. Fruit-culture with us is practically in its infancy as yet.

Mr. T. PRICE, M.P. : I quite agree with the view expressed regarding the necessity of having a travelling inspector or lecturer, and that Mr. Quinn should be relieved of his duties in connection with the Port Adelaide dépôt to enable him to travel about. As to giving instruction to the boys, I think the proper plan would be to suggest to the Minister of Education that Mr. Quinn or some other inspector should attend our public schools right throughout the country districts. A lecture such as we have had this morning before advanced classes in our public schools would make a lasting impression upon the minds of the youth. This is a matter of the greatest importance to the country.

Mr. W. J. VENNING : I wish to support the motion. I think it would be a splendid thing, and I hope the Minister will see his way clear to meet this reasonable request.

The CHAIRMAN : It is unfortunate that our schools have not orchards attached to them. In Germany teachers are expected to be quite up to the mark with respect to tree-culture. Would it not be well to add to the motion what Mr. Price has suggested ?

Mr. W. C. GRASBY : This opens up the question of technical education. The two questions are quite distinct, although closely related. I do not think it is advisable to tack Mr. Price's suggestion upon this motion. The resolution

could be given effect to by the Department of Agriculture without putting anything out of order.

Mr. R. CAMPBELL: I would suggest that some prominence should be given to the establishment of orchards in connection with the schoolhouses. In almost every district you can find a man who would give some portion of his time to help in this direction, and then the children would have a practical education as well as a theoretical.

The motion was carried unanimously.

Professor PERKINS: I take it as a compliment that Mr. Quinn has asked me to say something on the subject of pruning. Officially I have nothing to do with fruit trees, but I happen to be connected with the orchard at the Agricultural College. With regard to the motion which Mr. Rogers proposed, I should like to say that you will find in Mr. Quinn—if the Minister sees his way to allow him to undertake the work—a gentleman who thoroughly understands his work, and will do it conscientiously. I have always tried to secure his services as examiner of the students at the College. I hope that the suggestion will be adopted. I agree with everything Mr. Quinn said in his address this morning. There is one point which I would like to emphasise, because it is a point to which I have given some attention during the last few years, and that it is in reference to the breaking of shoots in piped fruit, viz., the apple and pear. That point is that if you break a shoot as Mr. Quinn showed you on the blackboard at the proper time you transform a strong shoot into a fruit-bearing shoot. But this breaking should take place at the proper season. I find that the best time for the purpose is December and January. You have to get the trees as the sap is going down, but it should not be too near autumn. Do not break them too early or too late. You have to take into consideration not only the districts but the seasons, and very often the season may upset all your operations. Supposing you break your shoots at the end of December. We get thunderstorms in December and January; then the best thing to do when the shoots which have started begin to get woody is to go round and break them again. Another point to which Mr. Quinn referred is the pruning of the spurs of apricots. In many orchards in the winter you will find they are covered with dead spurs, which arise simply because the spur is pruned on the flower bud and not on the wood bud. With an apricot base buds are never to be relied on. Rather when pruning an apricot spur shoot I would leave it to its full length if I could not find the proper wood bud. You want the wood bud not only for next year, but in order to draw the sap for the fruit. (Hear, hear)

Mr. W. MERCHANT—I have had to do with the treatment of trees for the last forty-five years. I have broken laterals during the summer season. I have done that very largely during the past season, and the results are very good. But different trees require different treatment. I should like to emphasize the point that the successful growth of fruit is a matter of study. You have to study your trees just as much as you have to study the bringing up of your family. I think it would be an excellent thing if Mr. Quinn's services were made available to our growers in the districts which he has not had the opportunity of visiting, and where the people are so anxious to receive the benefit of his instruction. (Applause.)

Mr. G. LAFFER: I have listened this morning with a great deal of pleasure to Mr. Quinn's address on fruit-pruning. In a blackboard demonstration like we have had this morning, accompanied by such an admirable lecture, we have an object lesson such as we cannot get by any amount of reading. As Mr. Merchant points out, the successful pruning of fruit trees depends very largely upon study and experience. I have no return yet from trees which I planted ten years ago, and if I went on pruning I do not think I should ever have any return. I do not think there is any subject on which advice is more necessary

than that of summer pruning. Some apple trees bear on the lateral shoots to some extent. The Shookley and Rome Beauty will always bear on the lateral shoots. The suggestion as to Mr. Quinn visiting various districts to instruct those who do not understand the pruning of trees is a very good one. If the Government appointed Mr. Quinn to that position he is fully competent to carry out the duties pertaining to it. (Applause.)

A DELEGATE: I should like to hear Mr. Quinn's views as regards breaking the lateral shoots after a fall of rain.

MR. QUINN: I quite agree with Professor Perkins that the only way out of the difficulty is to rebreak the shoots. Last winter I pruned a couple of pear trees, about 6 years old, I suppose. They were very vigorous trees, in good soil, and made very strong growth. In January I carried out tests of cutting and breaking at various times. If all things are favorable you will see the trees illustrated in the *Journal of Agriculture*. I wanted to get photographs to see the resulting growth from the breaking of one and the non-breaking of the other. From the tree that I had summer pruned I cut off in ten minutes all that was necessary to be cut from it in winter pruning. The other tree took me about thirty-five minutes to prune it away, and then I was not as well satisfied with it as with the other.

MR. VON BERTOUCH: It is taken for granted that everybody knows the difference between fruit spur and wood spur. Perhaps Mr. Quinn would kindly explain the difference. We may have to explain it at our Branches.

MR. QUINN: It is somewhat difficult to explain the difference between a fruit spur and a wood spur. If you take the peach and nectarine the fruit spur and the wood spur are the same. The spur is one growth, but along with the growth you will see buds of different sizes, and anyone beginning to prune should leave it a little later than otherwise because then the buds will show their shapes. In the apricot they are somewhat similar, the apricot bud is more pointed, and with regard to the pear and apple of course they develop largely and come out into little sharp almost like a thorn, and the bud upon the point develops until it is almost like a club point. It is almost impossible to explain the difference without specimens. In a garden we could show the distinction in a moment.

Feeding of Dairy Cows and Fattening Stock.

MR. F. E. H. W. KRICHAUFF read the following paper:—

Nobody can expect much milk from a cow or that stock should fatten on poor grazing country, or on a diet containing mostly water and no or hardly any oil or albuminoids. Most of our dairymen do not believe that land can be eaten out. This appeared quite plain to me when I was asked, at the Strathalbyn Conference, the reason why virgin lands lately broken up did not now give such good crops of cereals as had been formerly obtained from virgin lands of similar quality, frequently actually adjoining. My answer, that if the land had been used for grazing, perhaps even without extra feeding to the cattle, and received no manure except the droppings, its fertility had necessarily decreased, was by some considered to be incorrect; but even the quality as well as the quantity of the produce from such lands will be seriously affected by continuous grazing, and as to dairy produce, the aroma, firmness, and keeping qualities of butter and cheese will decrease proportionately as inferior grasses and weeds supplant the more nutritious grasses. It is with pastures as with cultivated fields, if they are neglected and not fertilised the yield of produce will not pay, and the produce itself deteriorate. The greatest yield of milk will be obtained from food rich in nitrogenous constituents, but the table I give hereunder should at once set this matter at rest. The cost to the soil per ton of dairy produce obtained from it will be, in pounds of—

	Nitrogen.	Phosphoric Acid.	Potash.
Milk	12.02	4.50	2.55
Cream	10.55	1.68	1.06
Skim Milk	12.39	5.07	2.85
Buttermilk	10.82	1.73	0.11
Whey	2.72	1.84	5.67
Butter	2.70	1.58	1.09
Cheese	112.00	17.85	2.15

Or the total cost of the above plant-foods removed from the soil, for every ton of milk, would be about 9s. 3d., and for a ton of cheese, £3 14s. 7½d. A ton of farmyard manure may supply sufficient plant-food for that removed by a ton of milk, but a ton of cheese will require as much as 11 tons of farmyard manure to replace the nitrogen, although it contains more phosphoric acid and much more potash. Other dairy produce requires, according to the above table, more or less plant-food, and it is clear that it must be given back to the soil. Farmyard manure cannot be better used than for pasture lands, where weeds will be less objectionable than on the arable land. Where it cannot be had, fertilisers can supply more correctly the proportion of the three plant-foods and the lime which should not be omitted in many localities.

The natural pasture, although important, should not be relied on entirely. Our climate misleads us to some extent in this respect. Our herds can remain all the year round in the open air, and we take not sufficient notice of the dry feed in high summer, or the watery grass which grows in many localities during winter. But few countries from which dairy produce is exported have such variable pastures. Without supplementary food, the milk supply, which rapidly increases in spring, runs down some months later as quickly, and the irregularity of supply is very detrimental to any export trade. Regular shipments are as important as quality itself. Of course wise dairymen in South Australia, who adopt partial soiling, will prefer to feed their cows supplementary to the grazing with food grown by themselves, and they consequently add hay, straw, clover, lucern, mangolds, turnips, potatoes, ensilage, &c. Except in hay and straw, however, the quantity of water in these foods is, according to Professor A. Smitham, from 68·74 per cent. to 91·85 per cent.; the oil in them only from 0·17 per cent. to 2·35 per cent.; and the albuminoids or nitrogenous compounds, only from 0·91 per cent. to 3·04 per cent. This lack of nitrogenous substance makes it necessary to also give fodder, both bulky and nitrogenous, like hay, straw, grain, or oilcake, which is necessary for ruminating animals. To know this is very important. A gallon of milk may contain 4ozs. of butter fat or twice as much, as many purchasers of milk find out to their cost, if they do not apply a test of the butter fat in the milk and pay accordingly. Food containing mostly water cannot supply much butter fat. Potatoes, the young grass, ensilage, turnips, mangolds, and carrots have therefore the effect of lowering the percentage of butter fat, although they increase the quantity of milk. But factories require a high percentage of fat in the milk, and this can only be reached by feeding also food rich in oils and albuminoids. Potatoes for feeding should not be boiled in water, which extracts salt and sugar, of so much importance as food; they should be steamed. An apparatus for steaming and another for crushing them can be purchased at no great expense. It is also necessary to remove the shoots, which contain the poison "solanin," from eating which cows will miscarry, and diarrhoea, gripes, and flatulency are certain to occur. If stock is turned into a crop of rape do not let them eat to satiety, or they will suffer from blowing. Green crops should be fed in variety when it can be managed. One furnishes nutritive food constituents which another lacks. When chiefly relying on pasture and crops of green feed or roots, much can be done to improve the former by manuring with Thomas phosphate and kainit, and hay contains much more albuminoids—actually up to 11 per cent. and more against 6 per cent.—and also phosphoric acid. Unmanured hay may contain only 0·4 per cent. of it; if manured with Thomas phosphate from 0·6 per cent. to 0·8 per cent. As to quantity of hay taken from a meadow which previously only gave 480lbs. per acre, Dr. Smets of Hasselt made interesting experiments. He applied, the first year, 250lbs. of Thomas phosphate and 80lbs. of kainit; in subsequent years, half these quantities, and mowed actually up to 2,400lbs. per acre. In the second year also a very much better crop was harvested; and this agrees with the opinion that Thomas phosphate acts slow, but can be felt up to seven and eight years. Professor Dr. Paul Wagner gave, in 1889, 16cwts. of it to an hectare and also 16cwts. of kainit, and harvested, in 1890, 15cwts. more hay; in 1891, 46cwts. more; in 1892, 52cwts. more; and even in 1897, yet 28cwts. more, without applying again Thomas phosphate, only 16cwts. of kainit every year. Experiments with equal weights of Thomas phosphate and superphosphate showed, in the three instances, always a somewhat better crop per acre from the former, viz., 2,045lbs. to 2,036lbs., 2,130lbs. to 1,700lbs., and 2,40lbs. to 2,210lbs. Other crops from your well manured arable soil will contain these probably in similar proportion. Your cattle will grow quicker, as their bones require phosphoric acid and lime—in fact four-fifths of the mineral portion in an animal consists of these, which they take through their food from the soil—and the albumen will nourish them so well that you expect most excellent animals with a frame fit for work. They are also able to supply large quantities of milk of fair quality. For every ton of hay, for instance, you ought to supply your soil, upon which it is to grow, with 1cwt. of a phosphatic manure containing 16 per cent. of phosphoric acid, and in some localities kainit, or in many other localities another potash manure. Doubtless similar quantities will be necessary on your grazing land if you have no farmyard dung. On meadows in Germany—of which, in South Australia, we have unfortunately only too few—5cwts. of Thomas phosphate per acre the first year increased the quantity of hay mowed from 17cwts. to 24cwts. per acre, and by applying the next year again 5cwts. the crop increased in one instance to 59cwts., and in

another to 71cwts. of hay against respectively 11cwts. and 20cwts. from similar meadows, which had received no manure. Analyses made to ascertain the quality of the hay from unmanured and manured meadows showed that the proportionate feeding value was as 100 to 104, where 8cwts. of Thomas phosphate and about 4½cwts. of kainit per acre had been used. Our strong soils may require but little, if any, kainit, but phosphoric acid may be necessary, and doubtless an analysis would give a similar result as regards the feeding value of our wheaten or oat hay. Manuring for oats with phosphates, potash, and nitrogenous manures will always give a gratifying result. Again, if you desire to have a fine crop of mangolds or turnips for fodder, Professor Wagner reports that Mr. Goebel obtained by manuring the latter with 480lbs. of kainit, 240lbs. of Thomas phosphate, and 240lbs. of nitrate of soda per acre, a net profit of £7 12s.; which decreased by £3 12s. if no kainit was used, by £3 6s. 4d. if no nitrate was applied, and by £5 8s. without the Thomas phosphate. Others recommend also for mangolds and turnips all these three plant-foods; but here, at all events, 5cwts. of nitrate of soda and 2½cwts. of superphosphate of 20 per cent, or Thomas phosphate, will probably be wanted, of which the nitrate is to be supplied in three portions, one-half at the ploughing and before sowing, 75lbs. at the first hoeing, and the other 75lbs at the second hoeing. Although most roots contain a very large quantity of water, this is certainly of much greater value for cattle than the water itself, used for drinking. Molasses is to be recommended as a fine fodder; the only question not yet quite solved for us is how to use it. In Germany it is very cheap and much mixed with peat, which, although it contains little or no feeding value, is merely mixed with it to prevent any trouble as to digestion, which might occur if fed by itself. But I do not see why it should not be diluted with warm water, and given as a drink. Mr. Valentine and others recommend 2lbs. of molasses in 2galls. of water poured on chaffed hay or straw: 3lbs. of molasses has been thus frequently given, and these have been found equal to about 3lbs. of crushed barley; and, if the quantity of milk is perhaps somewhat less, it seems that the milk fat has been, at times, at least nearly ½ per cent. more. Denmark, Sweden, Canada, and other countries, however, find it absolutely necessary to feed, in winter, with large quantities of oilcake, as well of linseed as of cocoanut, and Australia may have to feed the last-named (as now prepared in Sydney, New South Wales), in most localities, at least during two terms of the year—in winter and in high summer. I cannot say what the ration should be for milk cows in Australia, probably not less than 2lbs. per head per day, and mixed with chaff, when the grass begins to fail. For fattening calves a small quantity in the skim milk is advisable; and for fattening old or store cattle, about 5lbs. of oil cake is shortening the time to fit them for the butcher. And there are times when it will pay to thus quickly fatten cattle, even in Australia, 'or the oil passes into circulation and forms at once fat in the body. Cocoanut oil cake contains only 8.70 per cent. of water, but 14.96 of oil, and 21.19 per cent. of albuminoids. There are of course pollard, crushed oats, and other grains which may be fed, and they contain from 11.25 per cent. to 17.45 per cent. of water, from 4.06 per cent. to 6.77 per cent. of oil, and from 9.25 per cent. to 17.69 per cent. of albuminoids; but oilcakes seem preferable if the other foods have also to be purchased. And there is one matter which deserves general consideration for Australian dairymen. Our butter is, during perhaps eight months in the year, and exactly at the time butter can be exported from South Australia, too soft. The melting point of butter made from copra is from 13 to 14° Fahrenheit higher than from cows upon pastures, or fed on vetches, beans, oats, and probably other feeding stuffs. It is also said that dairymen in Denmark use more oilcake for their cows when the grass is at its best, as more butter requires "firming." On the whole it seems that dairymen, by using supplementary and especially commercial foods for their cattle, may perhaps keep twice the number of cattle, and obtain also a much better manure. A German proverb says, "The cow gives milk through the mouth."

Mr. T. PRICE, M.P. (who took the chair during the discussion): I am very much interested in dairying. I am part owner of ninety-three milking cows. I challenge any herd in the colony to produce more milk than is given by the herd of the Adelaide Co-operative Society. The average yield per cow for the year of that herd has been 47½galls., and we expect to reach 500galls. before very long.

A DELEGATE: I should like to ask Mr. Krichauff whether from any practical experience he may have had he can tell us if it would pay to manure land for pasture purposes.

The CHAIRMAN: I am quite sure it would pay, but I have not heard of any people who have done it. Unless you manure, either by fertilisers or by the stable manure, I think you will see your pasture lands deteriorating from year to year.

Mr. J. W. DALL: On this question I think I have satisfied myself that it

will pay to manure pasture land. Last year I manured a small paddock, something like three acres, and put it down with green feed. Owing to the drought it was very short, but it grew, and a lot of rubbish came up. That three acres cultivated with barley and manured kept eight cows for some weeks, and I do not think I ever knew our cows give such milk as they did when feeding on this three acres. It will pay to manure land for pasture and lay it down with barley, wheat, or oats. (Hear, hear.)

A DELEGATE: In manuring pasture land it is all very well if you can feed the grass down for the cattle while it is green, but how about the grass if it is left to go dry?

The CHAIRMAN: The manuring, of course, ought to take place before the winter, so that the qualities of the manure will fully enter the soil and so obtain probably not only a larger quantity of grass, but also grass for a longer time.

A DELEGATE: If we manure for pasture we must cut the grass before summer, because it would not be of any great value when it is dry.

Mr. DALL: I have proved to my entire satisfaction that dry grass is good feed until heavy rain falls.

A MEMBER: I find that cattle will go on superphosphate land whether it is wet or dry.

Mr. H. A. DAVIS: As far as manuring for pasture is concerned I do not think anyone who has been manuring with the drill for growing wheat for the last two or three years will have the slightest doubt that it will pay. We see a decided improvement in the grazing capacities of our paddocks. I have fifty or sixty sheep, over twenty horses, and a dozen cows on eighty acres. They have been there since the first rains in April, and even now those paddocks would cut a good crop. Sometimes we find after a crop has been cut for hay that it is a great advantage to sow a sprinkling of oats.

Mr. KRICHATFF: In Germany sometimes they cut a crop that will give only 480 lbs. per acre grass or dry hay; but in this instance it was nearly 2,000 lbs. per acre that was obtained, showing the influence that the manure had upon the hay crop. As to whether it would have a similar influence here is quite a different matter. I invite you to try manuring for pasture wherever possible.

A DELEGATE: I know from experience in the South that stock fatten very much more quickly on feed grown in a drier climate. I think our farmers generally in the North this year have the opportunity of preserving a great deal of the natural herbage. I have listened to the results and experiments as regards manures; but in our part of the colony we are not personally interested in this matter. The climate does not allow our soil to run out so quickly. The land takes a rest for itself—(laughter)—and the soil gets back some of the fertilising power it has lost.

Mr. HIRSCH: I have had a good deal of experience in farming in the Lower North, in the Middle North, and in the dry North, and with reference to the quality of the feed that grows in our northern country, let it be herbage or straw, I am convinced that it is far superior to that grown in the South. During some of the dry seasons, when we have had to get our chaff from the South, I found that one ton of chaff coming from the South was not better than half a ton of that grown in the North. I believe it would pay to manure grazing land. My cows never give a satisfactory supply of milk except on my other farm five miles away, where the natural saltbush grows and where they will double their quantity of milk.

Mr. SEABLE: I quite agree with Mr. Hirsch as regards salt. I believe that a large quantity of our Northern land is deficient in that article, but this last year or two I have applied salt. Since I applied it in the water and to the hay stacks I find my stock are thriving much better.

The Congress adjourned.

EVENING SESSION.

Agricultural Shows.

There was a crowded audience, which included agriculturists from all parts of the colony.

Professor LOWRIE, M.A., B.Sc., Principal of the Agricultural College at Roseworthy, gave an address on "Agricultural Shows." He said: We all take it that agricultural shows are for the advancement of agriculture. It is for me to discuss the matter, and in some respects I will have to question whether the agricultural shows, as now organised, are really for the advancement of agriculture. (Hear, hear.) As members of this Bureau and as members of the agricultural societies in different parts of the colony, it seems to me that we are prolonging that organisation in a somewhat different form to that which our ancestors started under the designation of the society called the Society for Improvers. We should endeavor, I take it, not only to improve agriculture, but to improve the means of improving agriculture—(cheers)—and if we can find any way in which to improve the Agricultural Bureau, or the results which should follow our agricultural shows, it is our duty to put forward the faith that is in us. (Hear, hear.) I do not wish in this discussion to be antagonistic to agricultural shows, even as they are conducted now—I mean antagonistic along the whole line, for there undoubtedly is much good accruing to the agriculturists of the colony from the shows; but I think that by more centralisation and working on a larger scale we will be able to benefit the agricultural interests of the colony to a considerably greater degree than at present. (Cheers.) Now we have agricultural shows almost as numerous, perhaps more numerous, than there are districts in which the totalizator works. Under the totalizator regulations, I understand, there cannot be two racing clubs within a certain distance of each other working the machine. If some such rule could apply to our agricultural societies in regard to holding shows I believe it would be a great advantage all round. (Cheers.) We have at the present time too many local shows. If we could conduct say three large shows, and at the same time carry on these local shows so that the people or agriculturists in the district may have a kind of friendly rivalry with each other, there would not be the objection: but the great objection I take to the multiplying of agricultural societies is that the system is the means of using up the funds which would enable central agricultural shows to be properly and efficiently conducted. The show held in Adelaide by the Royal Agricultural Society if you like could be looked upon as the national show, and the officers in the various local societies and prominent men in agricultural matters could help the national society by their subscriptions. As it is now, their efforts are used up in local shows, and we have a state of things where is no national show really. In England there are county shows. A county show is held at Newcastle, another at Oxford, and others in numerous districts of England; but there is also one great national show, which absorbs the best men throughout the kingdom. These men take an active part in the management, their subscriptions amount to something very considerable, and the result is that the Royal Agricultural Society of England is a wealthy corporation, able to offer prizes worth competing for, for the honor and also for the money value attached to them; and these prizes which have the highest money value generally have the highest honor attached to them. It is the means of making breeders of stock and manufacturers of implements put forward extra energy and use extra thought to try to take a leading place in this great show, which is not for any district at all, but for the nation. The Royal Agricultural Society's show is held at Carlisle, in the north of England, one year, at another time at Preston, another year near Windsor, another time at Manchester,

and another year at Birmingham. In Scotland there are numerous county shows, but there is also the national show held by the Highland Agricultural Society of Scotland in a different district every year. The population of the district is not considered to any great degree. The convenience of the residents of the different districts is considered, and the show is held in some districts which are relatively barren of population, so that the society may gain subscribers, and in that way concentrate its strength for the great effort which it makes with the object of improving stock and the appliances for agriculture. We, with our relatively small population, have no such opportunities for conducting a show on any such scale. This society will have probably from £80,000 to £100,000 deposited funds. There is no chance with our small population of having any such strong organisation as that; but there is much less chance of our ever having anything approaching it if we use up our funds in the numerous local societies in the way in which we are doing now. People are inclined to look upon the Adelaide show as simply a district show, but on a larger scale than other district shows for the reason that it is held in the neighborhood of a larger population, and they do not consider that it comes within the sphere of their duty to take any direct interest in that show by subscriptions or otherwise. If we could have a thoroughly good national show held in this district of Adelaide and two district shows, one in the north and one in the south, I make bold enough to say that would be sufficient for the population of this colony and as much as our means would allow. (Hear, hear.) Local shows instead of improving stock in very many instances encourage second rate form. (Hear, hear.) We have all been at district shows and know what they are. Of course every man in his own district thinks he has the best stock in that district, and something worth exhibiting. (Laughter, and "No.") You who are in the habit of going round these local shows will frequently see animals ticketed with a first prize that ought never to have had a prize at all. (Hear, hear.) Again and again I have seen it. I do not put myself forward as a judge to the extent that the Governor of Victoria did. His Excellency thought that an executioner should visit the shows and do away with a number of sires. I thought it was a wonderfully apt remark. I have seen animals again and again carrying tickets that no society of improvers of agriculture should have regarded as being suitable for use as sires.

A DELEGATE: The fault of the judges.

Professor LOWRIE: Yes; but they could use their discretion.

A DELEGATE: They don't do it.

Professor LOWRIE: I know that judges go to a local show and they say in effect, "We cannot be too exacting here. Are we going to throw out the whole class? We must remember that this is a local show." There are few judges who can stand up against that feeling. Judges do not want to condemn the stock of the particular district in any way. We see that in regard to draught horses. You know very well that draught horses in South Australia, from the point of view of the Clydesdale, are on the down grade. (Hear, hear.)

A DELEGATE: Weeds!

Professor LOWRIE: They have gone down decidedly since I came here. We do not now see four or five entries in a show ground of the quality of the animal we saw at the Adelaide Show to-day. There was only one there to-day. When I first came to Adelaide there were a number of good horses competing. I think that the local shows have a great deal to do with this deterioration. A beast gets a prize, and is travelled, and at not a particularly good fee. The farmer thinks the horse is not so good as it might be. Still he says it is a prize horse, and he uses it. We see much the same as regards cattle. You find bulls for dairy and other breeds obtaining prizes and going away with the

recommendation that they are fit for the improvement of stock, and are used for the degeneration of stock from the start. (Applause.) As regards sheep, many of our farmers have not had that practice which enables a man to know a sheep thoroughly well. Their time has been taken up with wheat-growing, because that was found in the early days to be the more remunerative practice. Sheep along with wheat have come in comparatively lately. A large number of men who keep sheep admit themselves that they are not first-class judges. Sheep are brought in, the judges look at them, and they get the prize. A farmer looks at them, and says, "Well, I have got something as good as them." We find in poultry that Bantams often get as much prominence in local shows as breeds which are recognised as being for the improvement of poultry. Do you find many shows in which the Dorkings and Leghorns are put prominently forward in the prize list. Don't you find Cochins and other breeds, unfortunately from a national point of view, getting some of these prizes. There is a decided want of appreciation of the breeds or varieties that are most likely to be for the benefit of the colony. Of all the vegetables that are shown, is 1 per cent. ever replanted and used for seed. If anything very superior in vegetables taking the prize at the show could be replanted and the seed secured, some benefit might accrue. But I really cannot see what possible advantage can follow the exhibition of certain vegetables or anything else that simply requires a little more watering. If you took mangolds, for instance, and considered the density, specific gravity, and percentage of sugar, as is done in some countries, and if that which came out best were planted for seed some value would follow from the exhibition. But you find that in many local shows nearly as much money is given for buttonholes and flowers as for stock and essential matters of agriculture. A local show takes up a vast amount of time. No doubt people who work hard want a holiday, and they want to meet their friends, but they get a good many opportunities of doing that at tea meetings. (Laughter.) You may have tea meetings, with merry-go-rounds and other things to suit the lads and lasses, and you can advance the marriage market just as is done at the present time without holding local shows, and you would save a lot of expense. There is the Government grant. That is relatively small in this colony, and I should like to see it extended. It varies according to the subscriptions of the societies, and is somewhere about £1,500 a year, which is measured out in £80 or £90 or £150, and its influence is only very little, whereas if there were three shows, and £500 were given to each, its influence would be felt. This money could be spent very much better in a few shows than at present, and the greatest drawback of all, to my mind, is that local shows use up the best men in the country. A good farmer is made the president of the local society, he is a committeeman—

A DELEGATE: A storekeeper or something of the kind, professor.

Professor LOWRIE: Not always. I know many men in the different districts who are prominent agriculturists and presidents of the local societies, and their time is taken up in bringing about a show that is a disadvantage, instead of an advantage, in many ways. If that same energy were given to the advancement of agriculture through the central societies for promoting the national shows, and a show in the North and another in the South, the results would be much more profitable.

A DELEGATE: Would you have a show on Yorke's Peninsula?

Professor LOWRIE: I think Yorke's Peninsula has a pretty good number. You have one at Stansbury, one at Minlaton, and one at Maitland. There are almost as many agricultural societies as farmers. (Laughter.)

The GENERAL SECRETARY: I have known seven shows to be held on one day.

Professor LOWRIE: If we could get rid of a lot of these agricultural

societies the money now paid out by men for their local shows would go towards the larger and national show, and that would be for increased funds and increased membership. Now the question is, how would you benefit through these larger societies? I will take it that in each of these three societies there will be offered a challenge cup of 150 or 200 guineas for the best entire horse under 6 years of age, on condition that the winner shall serve a certain number of mares at a price in the district. If 150 or 200 guineas were offered we would find that horses would come from the other colonies. It would increase the range of our selection. We should not look upon the matter in the paltry way of feeling that we must keep the prize to ourselves. (Hear, hear.) That is not the spirit that should rule agriculture. We should see that that prize in some way reflected advantage to us. By offering such a prize we might attract really first-class animals from New Zealand, Victoria, or elsewhere, or amongst ourselves if we could encourage our farmers to go and buy horses on the chance of getting the premium. Such a prize would increase the range of opportunities for getting the services of a valuable horse. Supposing the horse gained the challenge cup in the Adelaide district this year, he could be travelled for mares at 4 or 5 guineas each, and if he got seventy mares, that would be £280. Next year, as it was the national society's prize, the winning horse need not necessarily twice stand in the same district. You might get from the horse thirty colt foals, four of which may be worthy of keeping for sires. Such a method would lead to the positions of our draught horses being entirely changed. (Hear, hear.) We cannot do it now unless we go to the Government for the money which we have to pay ourselves in another form. If the shows were centralised we could do a great deal. Then we could follow out pretty well the same plan with regard to cattle. We could give better prizes for rams, for boars, and even down to the proper breeds of poultry. In Scotland practical farmers have formed the Entire Horse Association, to which they pay certain subscriptions which amount to a certain sum. They go to the Glasgow Stallion Show, and with their premium in their hand, select the best horse for their district. We have not the same population here, and the scheme I have sketched, I think, will meet the case better. When we have good prize money we can sacrifice what has been called the frills of agricultural exhibitions. A grand display of implements beautifully painted on humming shafts and guaranteed to do all manner of work, is nice enough in its way and good enough from the point of view of drawing a crowd and bringing in a little more money to the society, but it is of very little value for the improvement of agricultural implements. (Hear, hear.) Implements are not put to a proper test as a rule. By all means let implement manufacturers have their stands, and many of them will be willing no doubt to go to greater expenditure for permanent stands at these large exhibitions. Let the National Society have a thorough trial each year of one implement. Do not let us make a farce of the whole thing by giving prizes to implements which simply look well. Let there be a trial of one implement this year, say, ploughs, of all forms—single, double, treble, and multiple furrow-ploughs—and let the largest prize money to the number of mould boards which we think fits our conditions best—from three to five. Do not let us give, as we are doing now, the single-furrow plough, which is rarely used, as important a place as the three-furrow plough, for example. Make a distinction. One trial of ploughs could be continued for a week or a fortnight if you like. It would mean a few pounds for the expenses of the judges, who would be present at the trial the whole of the time. The public would not be there all the time, only on the final day. These implements should be thoroughly tested. The draught should be taken and all measurements and calculations which would be made by an engineer. An engineer can readily say what quantity of soil each plough

should lift and what is the right draught, and he can examine the material from which the implement is made very much better than the farmer can. The design, form, and material are matters on which we do not use the engineer enough. If we had a thorough trial of an implement this year we ought to be satisfied for ten or twelve years, and the firm which had spent money in improving the implement, and had paid its man well for bringing out the work, should have the best run for the prize, and the people would know which implement was amongst or was the best. Take binders; we have had trials of binders; there has been one nearly every year since I came here—in connection with the Adelaide society, and many trials in connection with the country societies, and what do they amount to? A binder comes on the field nicely oiled up and everything running smoothly, and it cuts two, three, or five acres and gets the prize. But more than that was wanted. There is more than the measuring of time taken to do the work compared with another machine. There is the draught, there is the strain which the different parts will stand, which an engineer working a duplicate machine could readily enough test, and the machine should be made to work until it has cut 200 acres at least, and every sheaf missed should be registered against it, and the bad time, the number of breakages, and other matters in which one machine excels another should be followed up to the very lowest detail, then the man who won the prize would have some reason for a column in the newspapers in connection with the Royal Agricultural Society's exhibition. I would have one machine following another.

A VOICE: How will you manage with the people about?

Professor LOWRIE: I am not expecting that a crowd of people would be present except on the final day of the trial. Surely a meeting like this could appoint men in whom they had confidence to conduct the trial. (Hear, hear.) The expenses of the judges of course would be paid. With such a thorough trial we would then have some reason for saying that one implement was better than another, and the person who was fortunate enough to win the prize could make use of it as the best advertisement he could have. (Hear, hear.) The Northern Yorke's Peninsula Bureaus have introduced what they call a Field Trial Society. It has not met with the financial support that I think it deserved. It is a nucleus from which I believe really good results should follow, but I think the sphere must first be enlarged. The effort is a highly laudable one, but I believe that it could be very much improved upon by having actual tests conducted by a national society. Take grain, for example. Prizes are offered for grain at the local show and at the Adelaide show. To what extent do the judges test the grain? They take the wheat, perhaps, by looking at the color, the size of the berry, and a few other things; but can the judges, when they have given the prize to a particular wheat, say which wheat is likely to make the most bread from a ton or a quarter, or from which they are likely to get the most dough? You know that wheat which weighs heavy and has a taking appearance satisfies the judges. A strong society could go further. The exhibit could contain up to 100 bags. The various entries would be ground under the same conditions, and the quantity of flour obtained would be measured, and the test would be continued to the baking of the bread, the number of loaves made, and the taste and appearance of the article. Then that wheat—whether Steinwedel, or Early Para, or Purple Straw—which came through a test at the National Agricultural Society's show first would be a very good wheat for farmers to grow. We are suffering now, and our millers are suffering, from a starchy wheat being too largely grown. South Australian flour is not holding the high place in the world's markets that it did some years ago. I read the price lists often enough to see other flours quoted £1 per ton higher than South Australian.

A DELEGATE: Too much headed wheat.

PROFESSOR LOWRIE: I would not say that, because our flour was going down before headers came in. The buying agent is at the bottom of it. There are many wheats which would make better flour than Purple Straw which buyers would dock in preference to Purple Straw.

A VOICE: Quite true.

PROFESSOR LOWRIE: A society such as I am sketching would, I hope, have millers in it. They would see the wheat that had won the prize, and they would be educated as well as the farmers. If we had the support of such a society the farmers would be enabled to grow more rust-proof wheats than at present. If we could have a big prize offered for wheat of a definite variety, and could follow it through all the stages I have indicated, we would lead to the improvement of agriculture, and in a way in which at present we do not. Then there are the educational advantages which a large show like that would do. Supposing, for example, we had on the champion sheep the judge's card, indicating wherein the animal excelled over other competitors. The judges would compare the sheep in quality, fulness of wool, and form, and if we could have the best sheep alongside with the judge's opinion given it would go a long way to helping us form a proper appreciation of the really good points. The best of us is willing to have a definite statement put before us in order to compare it with our own ideas; we have no opportunity of getting that unless we go and worry the life out of the judges. We do not know what led the judges to make a prize animal the champion. And so with cattle, dogs, and horses. Take our jumping competitors and horses in action. After all, what is the value of a jumping competition in the Adelaide show or a local show.

A DELEGATE: It attracts the public.

Professor LOWRIE: Yes; and gets gate money. If we had a large central show the society need not rely so much upon the gate money. (Hear, hear.) Is that little jumping around the ring likely to improve our weight-carrying horses or hunters? There are societies which pay great attention to this matter. At the Dublin Horse Society's show the horses are sent around a considerable course, they gallop against each other, people come there from all parts of Great Britain to buy hunters and pay up to 300 guineas for a good one, and they take this opportunity of seeing whether the horse is properly schooled. Can you see in Adelaide whether it is properly schooled? The really useful horse often does not get the prize. If we have funds enough to have good jumping trials by all means let us have them, and let us have them down on the Morphettville or Adelaide courses if you like. I take it that we are not using the means that we have for improving agriculture to the best advantage, but I believe that by sacrificing the great proportion of the local agricultural societies and having a real national society with two district societies we would not be flying too soon beyond our strength, but would really be husbanding our strength to properly and profitably advance agriculture in which we are all so much interested. I hope that something I have said will provoke discussion.* (Cheers.)

Mr. R. COOPER: Do you not think that the difficulty would be overcome as regards the breed of our horses if we could tax the entires? Many farmers do not profess to be judges, and so long as they get the services of a horse and procure a foal for 30s. it does not matter. I would willingly pay a £10 tax. Every horse that was not worth breeding from should be castrated or got rid of. I fully indorse Professor Lowrie's remarks. The remedy is less shows and bigger prizes than we have now. Three or four pounds is offered for the best horse. As one of the judges, I know another horse was entered against the one that was at the show in Adelaide to-day, but as soon as the owner

saw the other horse in he funk on it, and said it was not worth his trouble to bring his horse down. (Hear, hear.) There was as good a mare at the show to-day as I have seen for twenty years, and I think you will agree with me that the man who had that horse and mare there is deserving of encouragement. (Hear, hear.)

Mr. JEFFS (Kapunda): To a great extent I agree with what Professor Lowrie has said as regards forming the Adelaide Show into a national show, but I hardly think his idea of having two district shows would work out altogether satisfactorily. I do not think that the professor has taken into account the fact that the area in the north and south is so great that if you do away with local shows you would destroy a great deal of the interest now shown. I think that the better plan would be not to give subsidies to societies holding shows within a distance of twenty-five or thirty miles of each other, so that we should not have as many shows as at present. I believe that would meet the case very well. I think the reason we have not better competition in draught stock is that we have one or two really good stallions and the owners of the others are afraid to compete. It has been stated that the object of jumping competitions is to bring a crowd, but it is only right that there should be a crowd to bring in funds. If we are going to give good prizes and get good stock we must have the money from somewhere, and if we do not provide something attractive the people will not attend. That has been our object in Kapunda, at the same time keeping up the stock to as great an extent as we can. At Kapunda we do not take local judges. We select judges from all parts of the colony. We send to Adelaide for a number of our judges. We try to secure the services of men whom we consider most competent and as far away from Kapunda as possible.

A DELEGATE: And so do other societies.

Mr. JEFFS: I do not see how it can be said that we give prizes to animals not worthy. I know at Kapunda very frequently tickets come in stating "Not worthy of a prize." I firmly believe that country shows have improved the value of stock. Take Jersey cattle. Mr. Shakes and others at Kapunda have made Jersey cattle a study, and we have in the north Jersey cattle as good as were at the show to-day, as the result of prizes we offered for that class. Although the professor seems to laugh at giving prizes for buttonholes these are classes which should be encouraged. In the country this is the only exhibition of anything we have. We give these prizes for the sake of encouragement. Some societies offer prizes for writing copy-books; that is quite right.

Professor LOWRIE: No; that is not agriculture. Why not have a floral school demonstration?

Mr. JEFFS: We amalgamate the two.

A VOICE: That is co operation. (Laughter.)

Mr. JEFFS: I believe if we had only three shows in South Australia we would find that a great deal of the local interest would die out and the farmers in the outlying districts would not take the deep interest in shows that they do now.

A VOICE: It would reduce competition as well.

Mr. JEFFS: On the whole Professor Lowrie's admirable address will have a good effect. Two or three of the suggestions he threw out have benefited me and others who are interested in agricultural shows, and these I hope will be acted upon in years to come. (Applause.)

Mr. J. CORRELL: I trust the professor's address will prove as beneficial as he hopes it will. I agree that the deterioration of draught stock is due partly to the multiplying of the small shows and partly to the fact that a tax has not been put on stallions. I could give several instances where prizes were awarded

at a country show where they ought not to have been, and other cases where societies refuse to offer prizes for really deserving items.

Mr. H. KELLY: I should like to say that in the early days of the colony the South Australian Company landed a bull here called the "Comet." When it was known that the animal was to leave England for this colony almost three times the money was offered for it to retain it in the old country. But the South Australian Company said, "No; if the bull is good enough for England, it is good enough for South Australia." The company also brought out the finest ewes and lambs to give the industry a start. In 1855 £2,000 was subscribed amongst the farmers, and a gentleman was sent home to bring out horses. In 1851, when I went home to see, I bought one of the finest horses I could find. When the Bute trials were being undertaken I suggested that a dynamometer should be obtained to ascertain the draught of the implements, and it was astonishing to find the difference in the draught of the ploughs. I can assure you there is a great deal in what the professor has said to-night. In New South Wales they have a small flourmill with which to test the milling qualities of the different wheats. I am a member of the Royal Agricultural Society, and we give no prizes for agricultural implements without a trial. We give out the prize on condition that the trial is held and it comes to the satisfaction of the judges. (Hear, hear.) To-day I saw a disc plough. The owner of that plough was told that if he would give a trial and satisfy the judges he would get the prize. He said he would be quite willing to do so, and I have no doubt our society will make the trial known and there will be a thorough test.

Mr. PLUMMER: I think if Professor Lowrie's idea to have a national show and two district shows were carried out, we would still have local shows. The advantages to farmers through local shows cannot be forgotten. They will not travel long distances when they can see trials of implements almost at their doors. With regard to the local shows using up the funds, my opinion is that we ought to show for the honor of the thing, and not allow money prizes. (Hear, hear.)

Mr. FERGUSON: I quite agree with what the professor has said with regard to limiting the number of shows. The holding of three shows in the way the professor has sketched out would be far better for the colony at large. I do not think the interest taken in agricultural shows would be lessened at all. If the money were given in larger prizes there would be some honor in taking a prize. (Applause.) At present, wherever there is a public-house or a store, the people must have a show.

A DELEGATE: No. (Hear, hear.)

Mr. FERGUSON: Well, in the district of Tatiara, where I live, there are three shows within ten miles. With regard to the deterioration of horses, I do not think a tax on horses would make the difference some people think. If the Government refused to give the subsidy to some of the small societies I do not think we would have so many shows. If they had to travel further with their exhibits some people would never take them, because they know it would not be worth it. If the judges at a local show refused to give prizes to the stock in the show ground the society would not invite them to act next year. I think the farmers are very backward in taking advantage of the privileges they have.

Dr. OCKLEY: If we had fewer shows there would be better competition and far more honor attached to the prizes. It would be advisable to do away with the prize money. I cannot help thinking that our farmers do not take the same keen interest in agricultural shows as our fathers did.

Mr. R. CAMPBELL: I think one reason for the absence of competition is the dishonesty of exhibitors. I compliment the professor upon his boldness in hitting out against the present system.

Mr. LEHMANN: I compliment the professor upon the bold way in which he has spoken and the good judgment he has shown in his remarks to-night. I have had some experience of shows, and have watched what has been going on. I know that judges are invited to the show, and I have heard them say, "You must give a prize to such-and-such an animal in order to keep up the show. If you don't give prizes the owners will not show again." I am sorry to say that the deterioration of stock is to a great extent brought about by owners of horses. I have known from experience that really good horses have come into a district and the owners have taken every mare they could get. The result is that they have not left half a dozen foals sometimes.

Mr. W. H. HALL: I agree with a good deal the professor has said. But I take it as rather a sweeping change to bring about all at once. The National Society's Show should be held in Adelaide, and the two country societies should be affiliated with the parent society. I do not think that the Government should subsidise societies which cannot show a prize list of £400 or £500, and the affiliated societies with the parent society should select judges for the whole colony. There should not be so many local judges. Two shows—one in the North and another in the South—would not answer the requirements of South Australia. We are a scattered population, and therefore many country districts would be left absolutely in the cold. I do not think that that would be wise in the interests of the farmers and the breeders of stock.

A DELEGATE: I coincide with the professor with regard to there being too many shows. But I do not altogether agree with his remark that the National Show should always be held in Adelaide. We do not all live in Adelaide, and the Government do not give us all free railway passes to the city. We cannot bring our wives and families to Adelaide. Country shows are a source of education to the children. I would agree with Professor Lowrie on condition that he consented to the National Show being held one year in one place and another year in another. The remark as to inferior horses applies to the Adelaide Show as well as to country. If Professor Lowrie had attended the Crystal Brook Show this year he would have found much better horses there than at the Adelaide Show. A trial of binders in Adelaide would be of no use to us in the country. It was suggested that there should be a trial of double-furrow ploughs. But in Telowie we nearly all use eight-furrow ploughs. The trial would therefore be of little benefit to us if held in Adelaide every year. I should be glad to know that Professor Lowrie has means for testing wheats at the Agricultural College for the benefit of the agriculturists, I agree with him as to hunting horse competitions. At a show at Port Pirie a prize was offered for jumping horses, and I am confident that if the prizetaker had been put into the market he would not have fetched as much as the prize that was given to him.

Mr. W. J. VENNING: I regret Professor Lowrie made the remarks he did concerning our wheats. I have the highest honors given at exhibitions for wheats. The Red Straw, Winslow, Purple Straw, Tuscan, and White Lammas have brought credit to South Australia, and not the flinty wheats which the professor has talked about.

Professor LOWRIE: I never mentioned flinty wheats.

Mr. VENNING: I beg your pardon then, professor. I am sure that flinty wheats never will give the flour that other wheats have done. If the ideas of Professor Lowrie were given effect to people would not attend the shows like they do now. We held a show at Crystal Brook the last day of August and the day following we had a trial of implements, and it was admitted that it was a really practical exhibition. Are farmers coming to Adelaide to see a trial of implements? We want the trials locally. As to the question of horse-breeding, Mr. Cleggett, of Mount Barker, was the greatest horse-breeder we had. He said if you want to breed good horses breed in at the

mouth. And I say the want of feed is preventing the breeding of good horses. (Hear, hear.) I do not believe in these pampered horses. We want to breed from horses that have no hereditary ailments. I hope something will be done eventually which will result in the amalgamation of some of the country societies. I would thank the professor if he could devise some plan by which this could be done satisfactorily. I would like to propose a vote of thanks to the professor for the bold manner in which he has spoken, and for his valuable suggestions to the farmers to-night.

Mr. D. G. TEICHELMAUN: I will gladly second that proposition. I have been secretary of the Minlaton show for many years.

Mr. McCOLL: I think I may fairly say the farmers are not altogether to blame for growing the wheats they do. They grow the wheat which they can sell. The millers are to blame for any bad quality if there be any bad quality. We have grown bearded wheats, and they are noted for being of a harder quality than many other wheats. I know years ago the millers would buy, but they would not have it of that quality. I really think that if such tests were held as the professor and Mr. Kelly mentioned, it would be a very good thing for all concerned. Our millers want educating. I have seen in the papers that flinty wheats were the best. If those wheats are coming into favor in the home markets, then it is our place to grow them.

The motion was carried unanimously.

Professor LOWRIE: I thank you very much for the vote you have given me. I do not want to keep you long in replying to some statements made. I never expected that there would be absolute agreement, and it would not be a wholesome thing if there were. In connection with the scheme I suggested we ought to remember the cost of our implements and what percentage of the price is made up of the cost of the agents travelling round to the country shows. Is it 5 per cent. or 7 per cent.? (Hear, hear.) If we were to buy a binder now, say, at £45, and could get it for £40, and hand the £5 over to the National Society, it would be better than giving that £5 to the agent for his expenses in travelling round. I would not propose that the holding of the show in the north or south should be limited to one place. It would be advisable though that it should be held at a railway junction. If the shows were so much bigger than they are at present they would certainly attract more people. It has been pointed out that local competition is desirable, but pretty well everybody in a district has a chance of seeing the local animals and produce. You want to see things outside your district for educative purposes. A good deal has been said about wheat. I did not mention flinty wheats. I was referring to the hard and horny kind of grain. What I was taking objection to is that we have not the means of knowing whether the wheat to which we offer the prize is really the most desirable wheat for the colony as a whole. As to the deterioration of horses I think the explanation is partly that the heavier breeds of draught horses are not altogether suitable for our working conditions. We want utility as well as fair strength. I myself lean towards the heavy Clydesdale, although I do not think it is the most profitable. I think the Suffolk Punch and Cleveland could be profitably introduced into the colony.

FRIDAY MORNING SESSION.

The morning session was well attended.

Next Year's Meetings.

The CHAIRMAN: I think when so many farmers from all parts of the colony are in Adelaide it is a pity they cannot have some kind of reunion to talk and make friends. I do not know whether it would be well to appoint a committee to consider this question. We might have a smoke social next year.

THE GENERAL SECRETARY: It is highly desirable that we should have something of the kind suggested by our Chairman, but I do not see how we can fit it in with our Congress. We have so many papers and subjects down for discussion that meeting only once a year we really have no time, unless we arrange to have an extra day. We might begin the Congress next year on the Tuesday, and devote Friday night to the function suggested by the Chairman.

MR. GIBBONS: I will move that this matter be left with the members of the Central Branch of the Bureau to settle.

MR. HUTCHINSON: I have much pleasure in seconding that.

MR. T. PRICE, M.P.: I will support the suggestion. We ought to be brought more together. There would be no difficulty in arranging for a social meeting of some sort, and the cost would not amount to more than a shilling a head. (Hear, hear.)

The motion was carried.

Standard Weight of Chaff.

MR. R. W. KLEINSCHMIDT, of Woodside Branch, read the following paper:—

In introducing the discussion on this subject, I will first move that—"In the opinion of this Conference legislation should be introduced to indicate the standard weight of hay chaff offered for sale as provender, and that the weight of a bag of hay chaff be 42lbs., bag included." As such large quantities of hay are grown and sold in the colony it is highly desirable that sellers and buyers should have a clear understanding with regard to the conditions that should govern the market. So far as the farmer and wholesale purchaser are concerned the custom that has obtained hitherto, viz., that a ton of hay should weigh 2,240lbs. and a ton of chaff 2,000lbs., may do very well, but as the bulk of the hay sold at the present time is sold as chaff, and other than wholesale buyers are interested, it is desirable in the interest of justice that the sale should be regulated by a common standard. As matters are at present a consumer may order a ton of chaff from a farmer, and there is nothing to prevent the farmer delivering the same in either fifty bags of 42lbs., containing 2,100lbs., including the weight of the bags, or fifty-six bags weighing 42lbs. apiece. Now, so far as the wholesale purchaser who buys for his own use is concerned, no injustice could be experienced were the practice continued. He buys in the bulk, and it matters little, in a sense, to him whether he receives the chaff in 40lbs. bags or in bags containing twice or three times the quantity. But with the small purchaser the case is very different, and both in town and country large quantities of chaff are sold, not at the rate of so much per ton, but at the rate of so much per bag, and owing to the want of a standard the result is often unsatisfactory to both buyer and seller, especially when hay is scarce and the demand is active. Let me give an example. When the price of chaff is £2 10s. per ton the price per bag of 40lbs. should be 1s., or if retailed say 1s. 1d. or 1s. 2d. per bag, and this would give a profit of 4s. 2d. or 8s. 4d. per ton as the case may be, which, of course, the small purchaser has to pay. This represents a ton of fifty bags of chaff of the first quality. Now another dealer may arrange with a farmer to deliver him a ton of chaff or a number of tons of chaff of the same quality in bags weighing 35lbs. apiece and containing fifty-seven bags to the ton, which he could afford to sell at from a 1d. to 2d. a bag less than the other man, while deriving the same or even a greater profit from the transaction. Now this practice is more common than many are aware, and it must be admitted that it tells against the farmer, the honest merchant, the unsuspecting purchaser, and last, but not least, the poor animal so directly concerned in the transaction. Even when chaff is of a uniform and high standard quality it will be seen that the practice works out other than satisfactorily to perhaps all but one concerned—the dealer. But when inferior chaff is sold or good chaff with a percentage of "header stuff" the result is still more unsatisfactory, so much so that the honest farmer and the unsuspecting purchaser have occasion at times to use very strong adjectives. I am well aware of the fact that legislation cannot be expected to control the quality of hay offered for sale, but it is both reasonable and right to demand that the standard as indicated should be fixed by legislation. Although the weight of a bag of wheat has not been determined by Act of Parliament, or the weight of a bag of pollard or bran, the weight of a bushel has been placed beyond doubt, and these commodities are sold by the bushel. As lesser quantities than a ton of hay, or even 1cwt., are continually being sold and the bushel rule cannot be made to apply, the only way I see out of the difficulty is to indicate by legislation the weight of the bag, and experience has shown that 42lbs. will be a very fair standard. The weight of a loaf of bread has been determined by Act of Parliament, and there is good reason why the unsuspecting purchaser of the food of the poor brute should be similarly protected. As the practice that obtains is other than satisfactory, I move the motion, feeling confident that this Conference will support my action, and urge the introduction of legislation to deal as indicated with a question of great importance to farmers and others.

Mr. R. GIBBONS: I second the motion. There is no standard weight for a bag of chaff, but those who buy a bag of chaff expect to get 40lbs., but it is often found that there is only 35lbs. or 30lbs. in a bag. Some merchants offer fifty-six bags for a ton of chaff. Altogether too much water is used in cutting chaff. A standard should be fixed, and any person found selling below the standard should be liable to prosecution. Some think there is a great waste of bags. There is no trouble in getting 50lbs. into a bag. If I would be in order I would like to move—"That this Congress wait upon the Minister of Agriculture and ask the Minister if he would introduce a short Bill to fix the standard for a bag of chaff at 50lbs."

Mr. KLEINSCHMIDT: If the standard were 42lbs., and 50lbs. or 60lbs. were put in a bag, it would be easy to reckon 50lbs. as a bag and a quarter, and 60lbs. as a bag and a half. (Hear, hear.) We have as much as we can do to get 40lbs. in a wheat sack. I think we might leave 42lbs. as the standard, bag included.

Mr. SEARLE: As chaff varies very much I suggest that the standard be 40lbs. for a cornsack and 50lbs. for a bran bag.

Mr. DEMPSEY: The Dawson Branch discussed the matter, and it was suggested that the standard should be 50lbs. With bags sewn up and only 40lbs. they are rather sloppy and awkward to handle. Our Branch is very anxious to do something with regard to prohibiting the cutting of binder twine with hay chaff. It is thought in many cases it has caused the death of horses in the North. I will move as an amendment—"That the standard weight be fixed at 52lbs., bag included." There should also be legislation concerning the weight of a ton of chaff. Most buyers sell at 2,000lbs., and the railway carries at 2,240lbs. We should buy and sell at the same weight.

A DELEGATE: I would support the resolution with regard to the weight. We scarcely see a wheat bag with chaff. It is very desirable that we should regulate the standard. We want to know how much chaff we are buying. Many years ago I always bought at 2,000lbs., and when I went into the market to sell I found I had to sell at 2,240lbs. That, I believe, is the general experience. I second the proposition for 50lbs.

Mr. SONNEMANN: I do not think we could do better than fix the weight at 40lbs. net, or 42lbs. with the bag. You do not get 50lbs. in an ordinary cornsack, except in dry districts where hay is cleaner.

A DELEGATE: I fully agree with the last speaker. There are many districts where it would be very difficult to get 50lbs. of chaff into a cornsack. It would be more convenient to fix the weight at 40lbs.

Mr. T. PRICE, M.P.: I have to assist in making large purchases of chaff. We are very greatly interested in this question in the city. The St. Peters Corporation has moved in the matter, and tried to bring about an amendment of the present law as far as the city and suburbs are concerned. There is a standard fixed for bread and other foods, but there is no law to protect us with respect to the weight of chaff. We get the weight in the city of Adelaide, because chaff is principally bought at the mills, where they can buy water at 6d. per 1,000galls. (Laughter.) We get a good many pounds of water to make up the weight, and if we keep the chaff long it goes sour. As far as I am concerned we get it from the country where you have not got the water to put into it. We found it out two years ago, and we buy it from you because you do not give us so much water. I think a standard should be fixed. I think the question of buying long hay at 2,240lbs. per ton and then selling it at 2,000lbs. per ton as chaff is a mistake, and the weight ought to be fixed all round the same for buyer as the purchaser. If I was a purchaser of chaff I would stick to the 42lbs. per bag. I should always then know what I had got. It would be a bag of chaff always. If you fix it at 50lbs. you could not get

the full weight in the bag in some districts. I advise the meeting to stick to the 40lbs. net, or 42lbs. including the bag.

Mr. A. HARPER: I find in our part, as a rule, if we cut the hay dry it would be very difficult to cram 50lbs. into a cornsack; therefore I recommend that we stick to the 42lbs.

Mr. NEWMAN: At a meeting at Lucindale we were almost unanimously in favor of having 40lbs. to the bag. It is no trouble to get 50lbs. into a bag in our district, but in some places this would mean that the wheat bags would have to be discarded altogether, so the chances would be that in some places a man would get 60lbs. if the bag was full, and in another place he would get only 40lbs. We are strongly in favor of fixing a standard of 40lbs. I think a resolution carried by the Bureau would reflect the feeling of the country.

Mr. VENNING - I prefer to support the motion for 40lbs. per bag. People who bag chaff often keep a lot of old bags, and if you fixed it at 50lbs. these could not be used, or the seller would tear them crushing in the chaff.

Mr. H. A. DAVIS: The Riverton Branch carried a unanimous vote that the standard weight should be 50lbs. It was pointed out in the discussion that with 40lbs. there would be a great waste of bags, and that 50lbs. could be got into a bag quite easily. It means a saving of ten bags to the ton if you have 50lbs. If we send a truck load away it means using fifty bags less per truck, and the chaff can be packed more securely with the 50lb. bags. Our meeting thought that by adopting a standard of 50lbs. we should encourage the use of a much better quality of bag. As it is a great deal of chaff is lost on the road, and this sometimes accounts for chaff being short weight. Dealers around Adelaide will send anything in the shape of bags for chaff. I can understand that in some cases where the hay is very light and of strong growth there is some difficulty in getting 50lbs. into a bag, but the dealers can easily arrange this matter by sending bran bags to people supplying the lighter stuff and corn sacks to those who can get 50lbs. easily into a bag. Some chaff mills use the Duplex bagger, and they can easily work it. I find that the 40lb. bag is a great nuisance to the chaff merchant. For instance, my men have to use sometimes 200 bags per day extra than would be the case if we had the weight fixed at 50lbs. That means for me the employment of an extra man. If we fixed the standard at 50lbs. it would be a great help to the chaff dealers, who could then sell it a little cheaper to people in town, so that the purchaser would gain in the long run. We should fix it as nearly as we possibly can for the benefit of the farmer, the manufacturer, and the retailer. There is another advantage in having the standard at 50lbs. I agree with every word which has been said with regard to the necessity of fixing a standard weight. Many people are supplying fifty-six bags to the ton of chaff, and the retailers are selling the bags as full weight, and so are able to cut the prices as against those who give the proper weight. I am prepared to bring substantial evidence to prove that this is so. Yesterday a dealer said to me, "I can get chaff delivered to me at fifty-six bags to the ton at the same price as you charge, and I get a better profit." On questioning him I found that the bags are short weight, and I said, "If I am to depend on getting custom by selling my chaff in that way I will give up chaff-cutting and go out and crack stones." (Applause.)

Mr. D. G. STREIBLING: I do not see that it will make any difference to the purchaser whether we have 40lbs. or 50lbs. in a bag so long as we have a standard weight. I think it would be better to fix the standard low. If a man is travelling through a district he may prefer to have a 40lb. bag.

Mr. KLEINSCHMIDT: One gentleman says that if you put only 40lbs. in a bag that it means extra work, but in many districts the crushing of 50lbs. into a bag will mean extra work. In my district we have a job to get 40lbs. in. To get 50lbs. into a cornsack is impossible. As to the weight per ton, I think

the recognised quantity is 2,000lbs., the same as flour. Tramway companies and other firms prescribe 2,240lbs., and in tendering people put the price of the other six bags on.

Mr. DUNN: I have been a buyer and a seller of chaff, and personally I do not think it matters very much what the standard is fixed at. I prefer 40lbs, but if a person puts in 50lbs it will go a bag and a quarter and the price will be accordingly. If I buy a bag of chaff I can ask how many pounds there are, and if I like to be very careful I can get the bag weighed, and if the chaff is less in quantity than I paid for I have a remedy under the present law. In some places we could put in 60lbs., but that does not apply to all kinds of chaff. It would be unfair to ask people to get new bags because we wanted the standard to be fixed at 50lbs. The question is whether the thing is really necessary. I do not think there is much need for this change in the law. As to the weight per ton, if we ask for a quotation for a ton of chaff we want to know if the ton is 2,000lbs. or 2,240lbs. In our old lesson books a ton of long hay was said to weigh 2,240lbs. and a ton of chaff 2,000lbs. I do not think there is any need whatever to interfere with that; but I would strongly oppose fixing the standard weight of a bag at 50lbs.

A MEMBER: I would draw the attention of the meeting to the fact that if the standard weight should be fixed at more than 40lbs. the retailers would suffer a considerable loss. They would have to get new bags to get 50lbs. in, and the old bags would have to be thrown away.

Mr. DUNN: I have more objection to the cutting up of twine among the chaff than to the presence of water. Where chaff comes from the merchants we find that all the strings round the hay have been chaffed up. There has been a number of deaths of horses in consequence of this.

Mr. PLUMMER: I represent the Bowhill Branch, which thought that we should fix the bag at 40lbs. We grow stuff which would go 50lbs. to the ordinary wheat bag easily, but we want to consider the position of the whole of the colony, and so we thought it only fair that 40lbs. should be adopted as the standard weight. Chaff cut in the green stage is lighter than when left to get to the ripper stage; so when we try to get 50lbs. of the lighter stuff into an ordinary wheat bag we find it a difficult matter.

Mr. D. McINNES: At the Naracoorte Branch meeting we carried a resolution in favor of 45lbs to the bag. We can put 60lbs. or 70lbs. into an ordinary cornsack, and up to 100lbs. into an ordinary branbag, and we use no water at all. I do not think there is any need for legislation to interfere with the matter. We get too much of legislation. By-and-by we shall be told what amount we ought to eat. (Laughter.) I do not feel inclined to support the motion. If I support anything I would go for the 50lbs. to the bag. Our district grows heavy stuff and good stuff.

Mr. W. J. VENNING: Is the meeting going to ask Parliament to deal with the matter?

The GENERAL SECRETARY: That will come afterwards in another resolution.

The CHAIRMAN: The motion says "That in the opinion of the Conference legislation should be introduced." I will put the amendment, "For 50lbs. net to the bag, or 52lbs. including the bag."

Only seven hands were held up for the amendment, and the motion for 40lbs. net was carried by an overwhelming majority.

Mr. GIBBONS: I move "That the members of the Agricultural Bureau in congress assembled respectfully request the Hon. Minister of Agriculture to cause to be introduced into Parliament a Bill regulating the weight of a bag of chaff, fixing the standard at 40lbs. net, and the standard of a ton of chaff at 2,000lbs." We make this request of the Government in order to guard against dishonesty. We have had evidence of chaff being sold at short weight and

hosed with water in many mills. How can a man who is cutting his chaff dry and giving proper weight compete against dishonest people who do those things?

Mr. KLEINSCHMIDT: I have great pleasure in seconding the motion.

A MEMBER: We are now discussing something different from what we carried just now. We did not just now deal with the question of what should be the weight of a ton of chaff. The seller and the buyer I say ought to be on equal terms, which they have not been in the past. On the River Murray the New South Wales squatter and merchant say that 2,000lbs. is not a ton—that sugar and everything else, with the exception of flour, sells at 2,240lbs. to the ton, and they will not buy chaff at 2,000lbs. So long as it is understood that there should be a standard weight I do not know that we should object to its being 2,240lbs. I believe that in exporting chaff from the colony merchants have to supply that weight per ton. Whatever the weight, it should be uniform throughout the colonies to buyer and seller.

A DELEGATE: The quotation always specifies what the amount shall be in a ton.

Another DELEGATE: I think that the fixing of the weight per ton is a very important matter. People in New South Wales are willing to receive 2,000lbs. for a ton of flour because they know that is the standard weight, and they cannot expect more. That shows that if we fix the standard for chaff at 2,000lbs. they will not insist upon getting 2,240lbs. As a matter of fact it is the easy-going people, that simply buy their chaff at per ton without inquiring into the weight of it, who are the losers. In my opinion it is absolutely necessary that a standard should be fixed, and that 2,000lbs. per ton. Those buying chaff would then know exactly what they would get, and there would be no more complaint. (Hear, hear.)

Mr. DUNN: We are now asked to deal with two questions together. I suggest that we strike out from the motion the part dealing with the weight of a ton of chaff. That is a matter entirely between buyer and seller, and I think we should be interfering too much if we prescribed what should be considered a ton. We need no legislation on that at all.

Mr. JAMES UMPHERSTON (Mount Gambier): We can do our business as farmers without interference from Parliament. A few people in my district want the weight of a bag of chaff to be 50lbs., but we do not want anybody to tell us how we should sell our produce. You cannot keep us from doing our own work, or pass a law to prevent me from selling chaff in any way I please. We can sell it either at 2,000lbs. per ton, or at 112lbs. per cwt. We are burdened with too many useless laws already. Let us have a little more freedom and common sense.

Mr. SEARLE: We have a law in existence saying that 2,000lbs. constitute a ton of chaff, the same as it constitutes a ton of flour. The long hay is the raw material and the other the manufactured article. We have too much law already, and I see no need for the present proposal.

A DELEGATE: I suggest that the resolution relating to the bag be put to the meeting. I second the motion that we leave out the reference to the ton of chaff.

Mr. KLEINSCHMIDT: I do not see how we can fix the weight for a bag without fixing the number of bags to the ton. We certainly ought to make up our minds on the one question as well as on the other.

On being put to the meeting there were only nine votes in favor of striking out from the resolution the portion relating to the weight per ton. By a large majority it was decided that the motion should be dealt with in its entirety.

Mr. DAVIS: If we fix the ton at 2,000lbs., what are we going to do with people who sell at 2,240lbs. to the ton.

THE GENERAL SECRETARY: Of course we cannot prevent people from selling more than the specified quantity, but we may be sure that if they do so they will specify it in their contracts, and charge accordingly.

The motion was carried by twenty-seven votes to four.

MR. DEMPSEY: I would move a resolution asking the Government to include in the Bill a clause prohibiting the cutting of binder twine with hay chaff.

MR. DAVIS: No doubt a lot of string is cut up with the chaff, but this sort of chaff has been supplied to Adelaide horses for many years, and we never learned that any of them died from its effects. I should be inclined to think, that where horses have died in the country it has not been due to binder twine, but rather to want of feed or to sand.

MR. VENNING: I am sorry to admit that I think the death of horses in the North has been caused by the want of chaff and binder twine. (Laughter.) The poor things have gathered up sand and dirt which have killed them. It would be monstrous to legislate in the way proposed.

THE GENERAL SECRETARY: I may say that I have closely examined some of the balls from horses' stomachs which were supposed by some people to have been formed by binder twine. I found an immense quantity of stuff from the fibrous tomentum, or the wool off the face of hairy plants that horses will feed on in a drought, as well as bark and fibrous stuffs from the same sources. In no case, however, did I find any traces of binder twine.

The motion was not seconded.

MR. T. A. THOMAS (Johnburgh Branch), read the following paper:—

The Establishment of a Reserve Fund among Farmers.

Taking into consideration the fact that we live in a country subject to failures of various kinds, such as droughts, rust, fires, &c., that affect the agriculturists considerably, I think that the farmers should co-operate and try to raise a fund that would help to tide them over such periods of depression and loss. I am convinced that if something of this kind is not done the farmers in many parts of the colony will never be as successful as they otherwise would, for the old maxim says "Unity is strength." I would suggest a way of raising this fund, that every farmer subscribes £1 per annum. Say there are 5,000 or 6,000 farmers—there may be more in the colony; £5,000 or £6,000 every year, with interest, would in the course of a few years represent a big sum. For instance, consider how such a fund would have helped the northern and Murray Flat farmers during these two years of almost total failure. A fund like this would have enabled them to have bought their seed wheat, horse feed, &c., and as a consequence the drought would not have been felt so keenly by farmers and business men in the said districts. By establishing such a fund the farmers would help each other; perhaps those in the more favored parts of the colony would rarely or ever require to draw largely from this fund, but they still would have the privilege should the necessity arise, and, moreover, be helping their less fortunate friends by contributing their £1 yearly. Not only droughts, but in the case of fire, hail storms, or any other disaster to which farmers are liable in the colony, the one whose crop was damaged or destroyed would profit by this fund, in that he would be able to get money to compensate him for his loss, instead of having to borrow at a high rate of interest. I would suggest that a small rate of interest be charged, say 1 per cent. or $1\frac{1}{2}$ per cent., and the money be paid back in yearly instalments. Such a scheme will need to be well organised to be successful, for only in a case of absolute necessity should any one be able to draw from this source. When all parts of the colony were prosperous the fund would increase considerably, and perhaps never again will there be such a time of depression as the last two years have been. Certainly there would have been a large draw on the fund during this period; but if such had been established, say, fifteen years ago, I think it would have stood the strain of the last two or three years. The amount of £1 per year would not be a large contribution for each farmer, yet such would result in a strong fund always available when needed. It is not my intention to lay down any rules for the working of a scheme, but merely to bring the matter before the congress for consideration, and, if thought practicable, no doubt a more able pen than mine will take the matter up.

THE CHAIRMAN: This is a very important question for the farmers. When the first Register seed wheat fund was formed I suggested that we should charge a small rate of interest on the advances, so as to keep up the fund, which, although totalling only £725, would have been a nice nest egg. If the interest had been charged I believe the original amount would have been the same

to-day ; but there are always insolvencies and bad debts to be encountered, and so the fund has dwindled down to a small amount. An amount of £10,000 or £11,000 was served out last year without charging any interest whatever. It was a gift, but many who received advances were willing to pay interest. The general committee, however, would not hear of any charge being made for interest. When horse feed was required it was said that the amounts advanced would be returned. Very little has been returned, but still there is an amount of about £1,000 in hand, which I think would be a good nest egg for the establishment of a reserve fund amongst farmers. If you are really of opinion that such a fund is required, I think if something of the kind was passed here it would be a lever to induce the committee to hand over that amount as a nucleus of a permanent fund.

Mr. T. PRICE, M.P. : As this matter touches co-operation I think it ought to be encouraged. I expected our Chairman this morning would have dealt with the agricultural banks on the continent of Europe. These banks have been in existence for the assistance of the agriculturists pure and simple. The ramifications of the society involve transactions amounting to £400,000,000 per annum. It appears to me that the best thing I can do is to suggest that you should get hold of "Wolfe's Peoples' Banks." You will find the book of great interest, and it may afford much assistance to you. The project means that in given districts where the investors are known to each other they form themselves into a co-operative circle for their mutual assistance. You have first to destroy all that innate selfishness which is in us. The reason that the continental farmers have been able to do that has been because they were oppressed by the money-lending section of the community till life became a misery to them. Now they form themselves into these circles, from which a small contribution is regularly collected from the members. The money is vested in two or three trustees, and then it is loaned out to those who need it most among the members of the circle. The needy ones, therefore, get help from a fund that was established partly by their own effort, and directly intended for the help of people like themselves. A fund was first collected, and from that the farmers borrowed to assist them in their circles. The security asked for by this principal bank was the collective assurance or guarantee of the circle that the money would be repaid. Now Tom Jones, Dick Smith, and Bob Harris become a guarantee for me that I am an honest man and they have known me for a number of years, and so I get assistance. One of the best things that could be done for the agriculturists in this colony would be for you to depend upon yourselves, and form yourselves into these co-operative banks. A man who takes a deep interest in the matter is Mr. F. H. Snow, of Adelaide. He has the whole machinery at his finger ends, and he delivered a lecture on the principle before the Adelaide Co-operative Society. In this movement, properly carried out, every individual is a partner ; the individual effort is kept alive ; and at the same time the idea of affording assistance co-operatively is introduced. If you adopted this plan in the districts of this colony you might become independent of ordinary money-lenders, and you need not go cap in hand to the Government for help. (Hear, hear.)

Mr. PLUMMER : The subject raised by the paper is of the utmost importance to farmers, especially when we remember the experiences connected with the last two or three years of drought. Many farmers have been compelled to depend upon charity who, if such a bank as Mr. Price has described had been started a few years ago, would have been able to hold their own. It is our duty to formulate a scheme to help the farmer when in trouble.

Mr. NOLL : If such a fund were established it would be of the greatest help to farmers who need seed wheat or horsefeed after a season of failure. The question certainly ought to be taken up.

Mr. STRIBLING : I hope the meeting will consider the matter very carefully before coming to any decision upon it. In all these co-operative concerns there is a great deal of expense for working and for collecting the funds, and farmers, as well as other classes of people, are divided into the good and the bad. Some of them are given to be lazy. I am afraid that these co-operative banks would tend to encourage the thriftless ones. Within the area of reasonable rainfall the farmers can generally depend on getting something from their land. Twenty-five years ago a farmer had to stand on his own feet. If he fell it was no good going to the Government or land agent. I think we shall make rather a mistake if we vote for a scheme of this kind. I do not object to co-operation ; in fact, it is our duty to assist each other if we can. The public have done manfully during the last two years in assisting distressed farmers, and they would do the like again. We know, too, that the southern farmers have come nobly forward to assist those in the North. Within fifty miles of Adelaide we have never had any assistance from the Government or the general public, and I hope we shall never need to go to them for any.

A DELEGATE : Co-operation is very necessary for the welfare of all classes of workers. I take it that the farmers are workers. (Hear, hear.) The last speaker said the farmers within fifty miles of Adelaide never had help from the Government or the public ; but it must be borne in mind that their conditions as compared with other farmers in parts of the colony are exceedingly favorable, and they have had the advantage of being adjacent to a large population. I object to the pernicious principle of regarding the State as a milch cow, and maintain that by initiating a scheme such as this on a common-sense principle we shall establish a fund that will be beneficial, not only to the farmers, but also to South Australia. I feel keenly on this matter, because I am a native of South Australia, and would be glad to see everybody here prosperous and flourishing. I have relinquished farming for some years, but I can speak from experience in support of the proposal, on the ground that such a fund would be a great advantage to the farmers and to all who are connected with them.

Mr. PLUMMER : I beg to move that "The Branches of the Bureau be asked to discuss this subject and try to formulate some practicable scheme."

Mr. F. A. S. FIELD : I will second the motion. If the General Secretary will send round notices of the question to the Branches, we can get a representative and deliberate opinion upon it.

Mr. SEARLE : I live 250 miles away ; but I can boast that I have never received a penny from anybody. For all that, I fully approve of the scheme. It is a degradation to farmers to be always receiving public charity, and if we can assist one another we should do our utmost to that end. As Mr. Price has thrown out what appears to me to be a feasible scheme, we might consider the wisdom of building on it, and the Branches might study the matter and try to bring it to a practical issue.

Mr. DUNN : It would be a good thing if we could get a fund properly established, but I think it must be on lines similar to those suggested by Mr. Price.

The CHAIRMAN : I have never moved in this matter, because I think there is considerable difference between our colonial farmers and the farmers in Germany, where they are fixed to the soil. Here we are constantly shifting the population, and I felt that there would be a strong objection to a scheme which means that people should become bond for a man who may be here to-day and gone to-morrow. On the other hand, if you collected a fund in prosperous times and invested it in trustees, it would be of assistance to farmers in times of drought and scarcity, and the trustees in such a case would always be able to refuse to grant loans to persons who were not thoroughly free of objection. While I value the agricultural banks for Germany very highly, I do not think

such institutions would answer our purpose well here. A general fund, such as I have mentioned, would in my opinion answer the purpose much better, and more especially if you could have a good nest egg in the first instance. You cannot expect people to come forward every second or third year and subscribe to a fund to help farmers. Therefore it is a great pity that this £10,000 or £11,000 was not so dealt with that most of it could be got back again. I have nothing to say against Mr. Price's proposal except that we have not the same kind of farmers here that they have in Germany.

Mr. von BERTOUCH: I support the motion that the subject be referred to the Branches. We tried a little scheme of our own at Eudunda, where a great deal of suffering was occasioned. I suggested at a meeting that when a fair season came round each farmer in that particular district should contribute, say, a bushel or two or more bushels towards a fund to be of service in bad seasons. That was about three years ago. The farmers round about agreed to the idea and promised they would contribute as stated. But, unfortunately, we have had only bad seasons since then, and so the fund has never been set going. If we had had good seasons we would have started some such scheme in that district. If we have a fund for the colony, trustees should be appointed in Adelaide as a central trust. The applications for help should be made to branch trusts in the country districts, who should decide who was worthy to receive assistance and make recommendations accordingly. For the present I have much pleasure in supporting the proposal that the Branch Bureaus consider the whole matter.

The GENERAL SECRETARY: I think the subject had better be discussed by the Branches. I would like to ask what you would do if you had a fund and a man who contributed to it was adjudged unworthy of help from it?

Mr. von BERTOUCH: We considered that each branch of the society formed should remit whatever it collected in good seasons to the head trust. The latter body would retain the management and the control of the funds. Applications from sufferers would be referred first of all by the general committee to the local trustees, who would decide whether or not they were worthy of support. The support would be given by the central trust on the guarantee of the people in the district.

The CHAIRMAN: I can answer that question pretty fully, being one of the central committee of the Distressed Farmers' Fund. Very often we get a private letter from the committee of a branch saying that someone has applied for help, and that certain members of the district committee have recommended that he should receive a grant, and yet, the private letter says, "We think it would be better if the central committee declined the application." On such recommendation of course we have declined, and so the members of the branch committee have not got the blame for the refusal. So the difficulty just pointed out and referred to by Mr. von Bertouch would be very easily got over. All the blame can be put on the central committee.

Mr. PRICE, M.P.: The difficulty pointed out by Mr. Molneux is a very proper one to raise. But with the agricultural banks the local committee does not admit an unworthy person to join. The members must qualify themselves to get into the circle. You may have a man who may contribute to the fund, but who, if asked to administer it, would waste it. But you do not admit a man as member in the first place except on the understanding that he is a worthy individual. Accordingly, those outside the circle are continually anxious to come in, and so the institution is a stimulus to them to qualify themselves for it.

A DELEGATE: How would you get rid of him if he proved unworthy afterwards?

Mr. PRICE: The circle by a general vote could eject him.

Mr. J. WISHART : This subject is worthy of more consideration than we can give to it this morning. It comes as a surprise to us. The difficulty is not that it is undesirable to take it up—for it is thoroughly desirable that we should deal with it—but that we have nothing practicable to bring forward at present. There is the difficulty of administration. Ideas cannot be worked in small populations that are possible in large populations. In country districts a scheme cannot be carried out at the same rate of expenditure as in the city and surrounding places, and it is the difficulty of working an idea like that discussed to-day which prevents anything being done. In the district of Adelaide years ago farmers could raise produce of three times the value that is got from the same land now. There has been a drifting backward, caused by various circumstances—largely by pushing agricultural settlement too far out. If we could prevent agricultural settlement going further out, and draw it back to suitable land, our prosperity would to a very great extent return. People at one time found it impossible to get land in the districts where they wanted it, and they were forced to go out. I spent seventeen years farming, with the result of an aggregate crop for the whole period of less than 60 bushels per acre. I can vouch for that statement, and it is the case of hundreds now around me in a large district which the Government opened up for farming—the hundred of Schomburgk around Morgan. Of course we have lived by other things than wheat, but it has meant strenuous exertion and hard times. If people around Adelaide had our experience they might be very glad to apply for seed wheat.

Mr. STRIBLING : Farmers should never be encouraged to go into districts where they may need to apply for seed wheat. Our funds will be distributed over those places, and I do not know that much permanent good will be done. I would rather that this matter were discussed by the Branches. We came here quite unprepared for what has been brought forward. Let it be introduced again at the next Congress, when we may be able to formulate a workable scheme.

The GENERAL SECRETARY : The Government did not encourage the farmers to go beyond a certain line northward. The Surveyor-General fixed Goyder's line; but a certain section of the community, seeing good grass further north, said the Government desired to favor the squatters, and so they forced the Government to open up that land. I remember the circumstances well. It is hardly fair to charge absent men with having done what they have not done. The opening up of that country was due to the persistency of men who wanted to go on it, notwithstanding the good advice given them, not only by the Government, but by practical men. Do not blame the Government.

The CHAIRMAN : I will put the motion to the vote—"That the Branches of the Bureau be asked to discuss the establishment of a reserve fund for farmers and formulate some scheme."

The motion was carried unanimously.

In the evening the Chairman stated that he had been asked to read a letter received by the central committee of the Farmers' Relief Fund, from Mr. M. Shannon, of Pekina, who states that the Pekina committee desires, before the central committee breaks up, to intimate that they would like to see a Farmers' Fund collected after the coming harvest, and the amount banked for future emergency. Mr. Shannon remarks—"I am sure we could get several bags of wheat presented in our district. We could sell and forward the proceeds of the same to the Treasurer of the Farmers' Relief Fund. I am sure every member of my committee would assist. I trust your committee will favorably consider the above proposals at their final meeting." Mr. Shannon reports "splendid prospects of a good harvest all round the district."

FRIDAY EVENING.

Conservation of Fodder—Binder v. Stripper.

The GENERAL SECRETARY, in the absence of Mr King, read the following paper:—

In dealing with this subject I do not intend to condemn the stripper, as it has been and still is one of the farmer's best friends. It is especially valuable in our northern areas, where, owing to uncertain rainfall, the crops are often light—5bush. or 6bush. or even less per acre. Such crops will not pay to harvest except by means of the stripper, as binding is too expensive. Where the crops are fair to good, the binder should to a very large extent supersede the stripper. As we can start with the binder from six to ten days earlier than with the stripper, we remove with the crop all weeds, and consequently clean the land; a very great consideration to the farmer who desires to grow clean crops. I would not advise starting with the binder too early, as if you do you run the risk of spoiling the sample for market purposes, although for seed it may be all right. If you cut when the straw is quite green, the seed will be pinched. The heads should be well filled and the straw pretty well yellowed before starting with the binder. As many of us know to our cost, storms often occur when the wheat is nearly ripe, causing as much as 4bush. or 5bush. per acre to be lost, and in some cases even more. This is a loss to the world as well as to the individual; whereas, by using the binder, we run a week or more less risk, and although the sheaves may be somewhat damaged if a storm occurs, it would be nothing in comparison to the loss in a standing crop.

Then, apart from loss in this way, I believe that even with the best stripper enough wheat is very often left on the ground to pay for all the extra expense of binding and threshing. Farmers often do not recognise this loss, but still it occurs, though the fault may not necessarily lie with the stripper. I fully believe that from 3bush. to 1bush. per acre is knocked out in harvesting a 6bush. to 12bush. crop with the stripper. Bearing on this, I may say that last season I cut portion of a paddock with the binder and stripped the rest. Now there is only about a quarter to one-third of the wheat growing on the former as there is on the latter. The crop was short and light, and the stripper was in good order. When cut, the crop was nearly ready for stripping.

Another advantage of the binder is the valuable feed that is saved. Some will say this is only straw. So it is, but by some authorities it is estimated to contain about 75 per cent. of the nutriment of much of our hay. Even if it contains only half that, what an enormous amount of feed we waste every year. Had our northern farmers, and perhaps I might add our southern farmers as well, cut from a quarter to half their crops with the binder each year from 1889 to 1894, how many thousands of pounds worth of stock would have been saved during the past few years, to say nothing of the immense loss of time and money caused through having to remove our stock, or cart feed to them. Every farmer might have had from a few tons up to a few hundred tons of good clean straw, really valuable feed, which in many instances was allowed to go to waste. Some will doubtless say, would it not be just as good to cut and gather the straw after the stripper has been over the field? I think not. There must be a loss of nutriment for every day it is left standing, and, besides, the horses and machine knock a lot down.

Now in regard to the use of the header and steam thresher. I must say I prefer the latter. The former is a great success where the crops are 3ft. high and upwards. If the crop is much shorter, a lot of wheat is left in the centre of the sheaf near the bands, and the end comes out of the band. If the crop is longer very little wheat is left in, and the sheaves rarely fall to pieces. In every district there should be several headers, or, even better still, a steam thresher. A farmer with a header could do the threshing for several others. The steam thresher, however, is preferable to the header. Practically speaking, it gets out all the wheat, whether the crop is long or short; but unless there is a binder attachment the straw is loose. With the steam thresher all you treat during the day is cleaned and bagged, a very great advantage in the case of rain coming. The thresher puts more through in a day than the header. As far as our northern farmers are concerned, I feel sure they will not fail to profit by the severe lessons they have had, and that throughout the colony provision will be made whenever we get good seasons to conserve feed for the bad times which, sooner or later, we are sure to experience. I must admit that with headed straw there is the danger that owing to the grain in it the mice will play great havoc with the stacks in a "mice year," but with straw from the steam thresher there would be no danger. I have threshed a large portion of my crop this year with the steam thresher, and having a lot more wheat-chaff and cavings than I required, I was able to give some of my fellow farmers portion of it, and they seemed very thankful, as they considered it would make good feed for their stock. Some of these farmers have since told me that their horses did well on this chaff. Generally speaking, I consider farmers use too much of their crop every year for feed for their stock. As they come to realise this the binder will come more into use. By using more straw, and perhaps a little

more bran and pollard, or crushed wheats, oats, &c., we could feed our stock just as well and much cheaper than by cutting so much of the crop for hay. The addition of a little linseed or oilcake occasionally to the straw will keep the animals in good health.

Besides using the binder there are other ways of providing feed for our stock. We often allow a lot of good feed to run to seed and dry in the paddocks, not only wasting but re-seeding the land with weeds. By the expenditure of a few pounds this could be converted into ensilage or self-sown hay, before we need to harvest our sown crops. Instead of this, however, the feed is often blown away or burnt. It will, perhaps, be said that if cut and stacked the additional labor in feeding it to the stock makes it unprofitable. This can, however, be got over. Build the stack long and narrow, fence it so that the stock can get at one end only, and as the stack is eaten shift the rails back. The fence can be arranged so that this can be done with little trouble, and also so that the fence can be carried across the end to make the animals pick up all they pull down. One reason why this self-sown feed is neglected is that, owing to the stock eating out the grass, oats, &c., where it is sweetest, there are a number of large bare patches in the paddock. I think our paddocks in the North and Lower North are generally too large. If they were one-half or one-third as large, the best could be reserved from about the middle of August, and there would then be a nice crop ready for cutting before the hay crop is ready. As it is, it often happens that from August to December we have more feed than we know what to do with, whereas from March to end of May our stock are nearly starving. Then in many places we could grow summer fodders, such as lucern, sorghum, &c. I believe lucern will grow successfully in the North in many places where a few years ago the people thought it would not do at all. Sorghum will grow well on early fallows when there has been a fair rainfall, or where the land has been flooded, and as we sometimes get heavy summer rains, these crops would be greatly helped. Then, in many places, we could flood small portions of our land from the creeks and water-courses, which carry much water to waste. On such land we could often grow enough to tide our stock over the dry months, and those favorably situated could grow enough feed to fatten, or at least keep our stock fat, and sell them when fat stock is dearest. Would the results not pay us for all our trouble and expense?

THE GENERAL SECRETARY—I have seen frequently analyses showing that straw cut while the wheat is in the dough stage is about three-quarters the value of best wheaten hay. At the same time it has been proved over and over again that the grain cut when the wheat is in an advanced doughy stage is more nutritious, contains less bran, and is heavier than when left to become dead ripe. Then, in regard to straw left on the field, everyone acknowledges that the straw loses its nutritive qualities day by day, until the sugar, starch, gum, oil, and aroma are gone. Then, if you leave the straw behind there is the double labor—the labor of going over and stripping the grain, and then the labor of going to cut and rake up the straw, when you take up a lot of dirt, besides which the straw is of little or no value.

MR. DALL: I have used the header, and having done so once will be very careful before I use it a second time. It is quite true that straw is valuable, but the cost of binding the crop is increased very considerably when compared with stripping. Straw is often spoken of as being almost as good as hay, but I think those who have had experience in feeding stock on chaffed straw have found it is not good feed at all. It is very well for a makeshift, but unfortunately when we need the feed most in the northern districts there seems to be so little straw that is next to impossible to gather it with the binder. I took out the binder twelve months ago last harvest, and tried it on a very short crop to cut, so that we might thresh. I have a small threshing machine, and am rather inclined to think that it is preferable to the header; but I could not for the life of me get the crop properly bound. I could get it bound, but only as you might throw a bundle of straw together with a fork and put a band around it. It was impossible to get a proper sheaf. I think the cheapest and perhaps equally effective way is to let the binder follow the reaping machine, and keep both going at the same time. Most of the binders I think work on the inner side, and the stripper working on the off side gives you a very considerable advantage in cutting straw with the binder to the ordinary mower; but really, I consider that the binder and header, for successful farming, are out of the question for South Australia. This may be saying a good deal when so much

is said in favor of their use, but those who have experience of these things know something of the additional labor it puts them to. In the first place the crop has to be cut with the binder, which takes just about equal time to the stripper. Next, all the sheaves have to be placed in heaps: then the carting has to be done, afterwards the heading and the restacking. The carting, the heading, and the cleaning and the stacking of the straw are no small undertaking if there is a large quantity of it. I recommend my fellow farmers to be careful before they try this plan. If straw is to be saved I think it advisable to try to save it in a less expensive way.

MR. H. H. WHITTLE (Port Broughton): I have had a good deal of experience, and have proved beyond a doubt that headed stuff is very valuable for feed. Of course, we know all about the argument of getting the crop in quicker, and I am not going to advocate the cutting of the whole, or even half the crop with the binder. I believe that, especially on scrub lands, a farmer should cut a hundred acres or so of crop with a binder, either for heading or threshing. If you get a short crop you cannot get all the wheat out of it with the header, because you get a lot of the heads down with the bands, and very often with a thin crop you lose a good deal. You must not get your twine too near the end, or it may come off when the sheaf is put into the machine. Last year I tried to bind the crop from a piece of mullenised land, and had to give it up. I do not agree with Mr. King as to the loss with the stripper. I do not think a stripper in good order will waste anything like a bushel of wheat in a twelve-bushel crop; I do not think the loss would be more than quarter of a bushel. (Hear, hear.) A binder will lose quite as much. I believe in storing straw as a stand-by in the Northern areas, and that the crop had better be threshed for the purpose with a threshing machine. Supposing you want to save as much as you can to reap for wheat, and you cut a small portion to use for horse feed in the winter; leave a bushel of wheat in the fallow crop, and it is not lost, for your horses get it; put it by and it is lost. But put it through the thrasher and you would lose hardly anything. I have been connected with a small company at Port Germein which purchased a thrasher. By using elevators and so on you can with a thrasher save a lot of manual labor. On scrub lands with light soil I have found that where crops are light you do not get much growth to cut for hay, but by using drills and manure you would get a good deal of stuff without going over much land. Then cut half of it with a binder and header, and you get a lot of hay and straw, and can economise in feeding stock.

MR. H. ALDENHOVEN: As to the analysis of the straw showing two-thirds of the value of clean hay I take it that the General Secretary refers to the nutritive properties of the straw. I have been told by several farmers that their stock do not do well on chaff from headed straw on account of it not being so digestible as hay chaff, but that those who used pollard and bran to make up the deficiency found that the straw chaff acted as well as hay did. I cannot agree with two of the previous speakers in respect to the loss of grain with the header, because I do not think there need be any loss at all. Last year I bound a lot of short stuff that I could not rake up, and although the heads were all over the sheaves I put the whole lot through and threshed it out as in a threshing machine.

A DELEGATE: How would you separate the stuff?

MR. ALDENHOVEN: You can easily provide for that; shake it over. There need be no loss. If you had long stuff you would not put it through if the sheaves were not bound properly. I spoke to two men on the show ground to-day, and they said they put sheaves through altogether with a different sort of header to mine. I should use the binder any day and cut as much as I could, so that I should lose no time and run no risk. If done well and at the right time there is no danger of losing any of the crop in rough weather.

Mr. NOLL: I agree with Mr. King's paper. I have had experience in cutting a crop with a binder and header. Two or three years ago I cut twenty acres with a binder, and the crop stood from 3ft. to 4ft. high. It wants a good crop, because with a small crop the stuff gets mixed and you cannot do it well. With a good crop the binder cuts it clean and leaves nothing on the ground, and as you are able to go out with the binder some days before you can use the stripper you guard against possible loss. The straw is valuable as hay if cut in an early stage. It does not require so much extra work as some of us think; besides you can do a lot of the work when the busiest part of the harvest is over. After the stripping and all the other harvesting is finished you have time to go on with the other work. Even if there are heavy rains the sheaves will not suffer if they are properly stood up. If you use the straw by itself of course it will scour the horses. I found it so; but having a stack of 30 tons of straw, which stood for two years, I found its value. Although it stood so long the mice did not do much damage. Even after that time it was more valuable for food than much of the hay that is cut up.

Mr. WHITTLE: I witnessed a very heavy loss by cutting with a binder in Baroota one season. We had a lot of stuff bound, and there came about 3in. of rain. Before the sheaves could be stood up the grain had started growing again.

The GENERAL SECRETARY: I recollect when the grain grew in the bags after having being harvested with the stripper.

Mr. WHITTLE: As to putting a whole sheaf through the header, I can say that with some machines you could put the whole sheaf through twice, and it would not thresh it properly.

Mr. ALDENHOVEN: Last year I threshed a crop of barley. I heard it said that the header did not do well at all, but at my own place we found that the speed made all the difference if you want to do proper work. The fault may have been in the horse power.

Mr. DALL: The threshing machine will deal with straw and take the wheat out of it, but of course as soon as you let the sheaf go the header has lost its chance and will beat at the straw and not the head. We should not run the header down because it will not do work that it is not adapted for.

Mr. PLUMMER: When this subject is introduced it generally leads to a discussion on binder *versus* stripper. I think this should not be; the two should be used together. The benefits that we would derive from the binder when we cannot use the stripper would, I believe, pay for purchasing the binder. Now, I think it would pay us better if, instead of going in for damp-weather strippers, we purchased binders, and mowed the wheat when we could not get it in with strippers. In our district there are a lot of self-sown crops, and they are so thick that they show there was a tremendous waste with the stripper. We can see the advantages of the binder. The year before last one of my neighbors had a large stack of straw taken off his land with the binder, and, the feed throughout the neighborhood being scarce, he sold most of it £3 a ton; so by having a binder we conserve fodder that is very valuable. With regard to the remark that there is so much extra expense in using the binder, I think that the saving made through getting the crop off earlier would make that up.

Mr. W. H. BYERLEE: Although I have never used the binder, I believe it is a valuable adjunct to the stripper. Regarding straw chaff, I have had some rather adverse experience. I have bought headed chaff, hay chaff, and chaffed straw. I must say that with the headed chaff I had to put a great deal of bran and pollard to bring it up to the quality of chaffed hay as feed, and with the chaffed dry straw I had to mix a good quantity of bran and pollard to bring it up even to the quality of wheaten chaff.

A DELEGATE: Do you mean cocky chaff?

Mr. BYERLEE: Yes. The market for chaffed straw and chaffed headed stuff during the last year or two showed fictitious values, because everything in the shape of ordinary feed had been sold. If people could get wheaten chaff they would not buy headed straw chaff. As regards the controversy about the header, a friend of mine has a header with a kind of shaker that shakes out the straw. He lets the whole sheaf go through. It is a rake, with other rakes working through it, so that it rakes it out very much like our damp-weather strippers, and the straw is increased in value by being bruised by the rakes. In fact, it goes out half chaffed. I think that a header of that description would overcome the difficulty with the binding of short sheaves.

Mr. SEARLE: It has been pointed out that in years of scarcity little or no straw can be harvested by the binder on account of its shortness; but let us remember that in years of plenty the binder stores for years of scarcity, and we are anticipating that this will be one of the best harvests we have ever had in the North. I think the paper we have heard read is a valuable one at the present time. If the crops continue growing as they have done there will be a great many 5ft. to 6ft. in height, and if that is harvested in the dough state the farmers will have an abundance stored away for lean years we may have in the near future. As regards the value of the straw it depends on the time it is harvested. I am afraid, though, that if you have the value in the straw you lose it from the grain. If the crop is harvested ten or twelve days before it is fit for the stripper the straw will be more valuable, but the grain will be poor. I believe that a great amount of the inferior flour put on the market to-day is owing to wheat having been reaped in the dough state. Still, those who have the binder for the hay crops would be very foolish if they did not harvest portion of their wheat crops with it, if only for seed purposes.

Mr. WHITTLE: So little wheat has been headed in this colony that I do not see that it could have any effect on the quality of our flour. (Hear, hear.) The expense of using the binder in damp weather would be too great, I think. If you have a fairly heavy crop it will cost you a good sum in string alone.

Mr. HUTCHINSON: It has been stated that the binder can be used ten or twelve days before the stripper, and that the grain would not lose any of its value. I would like to know if the grain derives any benefit from being reaped so early?

The GENERAL SECRETARY: We have had samples more than once of grain reaped early, and the early reaped wheat has been heavier than that reaped late. With regard to flour it is known that the grain cut early has a considerably greater nutritive value than that cut late. When the diggings first started men went off and left their crops standing. They came back as late as February, and the flour they got from their wheat was like flour made from rice; it had lost its gluten owing to the crop having stood so long.

Mr. SEARLE: There is reason in all things. That crop was left too long. I believe that our wheats, if reaped in the dough state, are something like the New Zealand and English wheats. They are too damp.

Mr. WHITTLE: Where a lot of wheat has been standing too long the millers characterise it as "bleached," and dock it accordingly.

Mr. BYERLEE: If we take wheat to the miller with a few green grains in it he will not buy it.

Mr. DALL: Stripping green wheat and binding green wheat are entirely different things. Leave the grain in the stalk and it will ripen.

Mr. HUTCHINSON: Must the wheat not be left a certain time in the sheaf before you take it out?

The GENERAL SECRETARY: Yes, always. I know that we have had reports from time to time on this subject, and that many experiments have been tried one against the other in favor of the binder as against the stripper and *vice versa*.

Mr. NOLL: If wheat is cut very early and quite green you cannot expect to get plump grain. Some of my sheaves looked green, but the grain was plump and of a grand color. (Hear, hear.) As regards seed wheat, I think the general opinion is that wheat for seed should be thoroughly ripe.

Mr. DALL: What stage was yours in when you cut it?

Mr. NOLL: I think I began about ten or twelve days before I started the stripper. There were no green grains. The controversy of the binder *versus* stripper is a mistake; the binder should be used along with the stripper. It would be useless to try to replace the stripper. The stripper is undoubtedly the machine with which to harvest the main portion of the crops.

Mr. ALDENHOVEN: As far as my experience goes I have much more satisfaction with wheat from the header than the stripper.

Mr. WHITTLE: It goes almost without saying that for seed purposes fully-matured grain is wanted. Some varieties of wheat can be cut much earlier than others.

The GENERAL SECRETARY: A good many people have had experience with the string binder and the stripper. There was a big competition a good many years ago near Gawler, when a £100 prize was offered for the best means of harvesting a crop. At that competition there were binders and strippers. The crop was Purple Straw fully ripe, and the weather was quite hot. I was very much interested in the competition. I believe I collected £75 of the prize money from people in town. Before anything was done I asked Mr. Harvey, Mr. McCallum, of Sandy Creek, and another gentleman to go into the crop and see what was lying upon the ground. They went in and carefully inspected, and said practically nothing. After the crops were reaped they went to where the string binder was at work and they found no waste, and they went to where the stripper had been at work and they found about a bushel and a half per acre on the land. In America, where they have regular threshing gangs which go round and thresh the crops after being harvested, they will shift the machinery four or five times a day, put the straw up in stacks, and do everything for a charge of from 6 cents to 8 cents (3d. to 4d.) a bushel. Moreover, they do their own cooking. They do not trouble the farmer's wife and family to slave for a lot of men at harvest time. (Hear, hear.) The crop should be cut in the dough stage to be nutritious. With regard to a very poor thin crop no one would advocate that it should be tied with a string binder. It would not pay to bind, but when you have a crop going, say, 12 bush., even Professor Lowrie would advocate cutting if you have plenty of straw to save.

Mr. DALL: I should like to say in defence of what I said just now that short straw is much more valuable than the long. "Cocky" chaff is worth more from a poor crop. I would sooner have one ton of straw from a short crop than more from a strong one. The feeding value of short straw is worth double that of the long.

The GENERAL SECRETARY: If you cut it early you do not want it fully matured.

Mr. DALL: Then the bottom part, if you cut it early, is indigestible and does harm to the stock.

Mr. SCHINCKEL: I agree with this paper to a great extent, but I cannot follow Mr. King in advocating the use of the header. I think most farmers could have an implement that would do the work quite as well, and with less labor—that is, by putting the sheaves straight through the chaffcutter. It does not matter whether you have long or short straws. I found the chaffcutter answered very well on Cape barley. Then I tried with wheat and it also answered well. I do not think there is anything like as much grain left in the chaff as by the use of the header. My experience is that it takes five men to work the header. A man could put up a fairly sized shed for housing the chaff for the same amount of money that it would cost for a header.

Mr. J. CORRELL: I think that losses put down to the use of the binder have been exaggerated in some cases. We have had some experience with the binder. We cut a crop of oats which went 23bush., and there was not half a bushel lost in the binder or left on the sheaf combined. We took more out of the sheaf than would be taken generally, because we spent more time over it. With regard to the quality of the grain we have found that the grain if cut, not too green, but when it has just become firm, is heavier, of better color, and germinates better, and we prefer it for seed. I would strongly recommend cutting hay with the binder. You can cart it in in very much less time, the hay occupies less space for stacking, and is of better quality all round.

The CHAIRMAN: Is there anyone here who has had experience with the steam thresher?

Mr. WHITTLE: The experience our company had with it was that we found it worked very well; but I would not advocate the use of the thresher to any great extent because of the labor.

The GENERAL SECRETARY: Some objection was made that supposing we put the stuff through the chaffcutter you could not get a store large enough to hold it, but I hope we shall have quite a new departure in regard to stores. The Minister of Agriculture has decided, at the request of the Professor of Agriculture and myself, to procure from England one of the continuous baling presses, which will be placed at the college at Roseworthy. In Kansas they use these bales for all sorts of shelters. They can be built up in walls very cheaply, and the walls are a standing insurance against periods of drought.

Mr. CORRELL: I agree to a great extent with the remarks in the opening of this paper. I have had considerable experience with the binder. I find that it is not a success to attempt to bind a very thin crop. It has not sufficient growth to make it fall properly. If the crop is very thick you can make a decent sheaf out of a crop not more than 18in. long. The header should be more used than at present as a means of providing against dry seasons. We can store up very large stacks of good feed in good seasons very cheaply, and leaving the stuff in a dry position it will stand for years without injury. Our experience with binding is that it is a disadvantage to let the crop get too ripe.

Mr. HIRSCH: I have not had any practical experience in this matter. I have read Mr. King's paper. I think it is a very good lesson for us to follow, to a certain extent. Although I am of opinion that the stripper can never take the place of the reaper, at the same time it is almost a necessity for us. Nearly every farmer has a binder, and most farmers have a stripper.

Increase of Membership.

Mr. W. J. VENNING: I should like to bring a matter forward before the Congress closes. At Crystal Brook several persons in the district want to join our Branch, but cannot because the maximum number is fifteen. Let us fix a minimum and allow each Branch to have as many members as it likes. (Hear, hear.)

The GENERAL SECRETARY: No, no. Each member of the Bureau gets a free copy of the *Journal of Agriculture*, and if you allow each Branch to have as many members as it would like you will have scores of people joining for the purpose of getting this most valuable publication. (Laughter, and Hear, hear.)

Mr. CORRELL: I consider fifteen is ample, especially as the Bureau meetings in each district are open and anyone is welcome to take part in the discussions. (Hear, hear.)

The matter dropped.

Question Time for Delegates.

Mr. ROGERS: I should like to move a resolution—"That in the arrangement for next year's Congress of the Agricultural Bureau the General Secretary should be asked to set aside one hour, during which delegates may be enabled to put any questions which their Branches would like to have answered." I think that this is a very important matter. I have three questions myself to put, but it is too late now to ask them.

Conclusion: Votes of Thanks.

The GENERAL SECRETARY: I have very much pleasure in moving a comprehensive and cordial vote of thanks to all those gentlemen who have provided papers and given addresses, and have discussed them so intellectually, so wisely, and so instructively.

Mr. DALL: I second the motion.

The proposition was carried unanimously.

Mr. DALL: I move a vote of thanks to our Chairman. He has done noble work.

Mr. HIRSCH: I have very great pleasure in seconding the motion. Our Chairman is heart and soul in this Bureau work.

The motion was agreed to with acclamation.

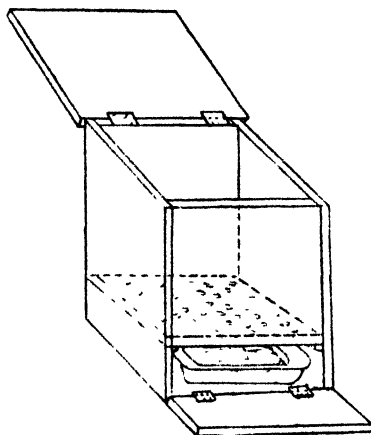
The CHAIRMAN: I am very much obliged to you, gentlemen. I hope we shall all do more, and that we shall have greater success in all we do, because what we are doing is for the benefit of South Australia. (Applause.)

IMPROVEMENT OF CEREALS.

Whilst it is comparatively easy to improve live stock by intelligent and careful crossing and culling, or to produce newer and more desirable varieties of vegetables, fruits, and flowers by judicious cross-fertilisation and selection, it is by no means an easy task to cross-fertilise the flowers of a cereal. "To fertilise the pistils in the flower of a wheat plant by the introduction of pollen from another plant is an operation which requires infinite care, skill, and patience," says a writer in the *London Daily Chronicle*, and even when the operation has been successfully conducted each separate grain produced must be carefully watched in its progeny for several years successively, and all that show deterioration or reversion to original types must be culled or rejected until a fixed habit or character is secured, provided the cross in the first place appears to be worthy of propagation, which is seldom the case. In England several specialists have experimented in cross-fertilisation of wheat and other cereals, and a number of new varieties have been brought under the notice of agriculturists. Few of the new introductions, however, have been largely adopted by our farmers. Amongst the experimenters were Maund & Rayabird, since 1846; Carters, the well-known seedsmen, since 1883; and Garton Brothers, of Lancashire, since 1880. A large number of Carter's cross-bred wheats have been tried in South Australia, but none proved suitable to our requirements. The Garton Brothers have, it is stated, made some phenomenal advances in the improvement of cereals of all kinds lately by means of cross-fertilisation and selection. Wheats show 60 per cent. advance upon the average weight of grains in ordinary cultivation; with oats they have been even more successful, and it is claimed that the yield per acre is increased 30 to 40 per cent. In order to carry out their experiments the firm procured over 300 varieties of wheats, 100 of oats, seventy of barley, and several other cereals from all parts of the world, and cultivated and cross fertilised them until varieties were produced which promised to be worth further experiments. These were grown side by side, and culled and selected for several years, until finally the true type of each cross-bred cereal was firmly fixed, and the seed when resown produced pure forms throughout the whole plot.

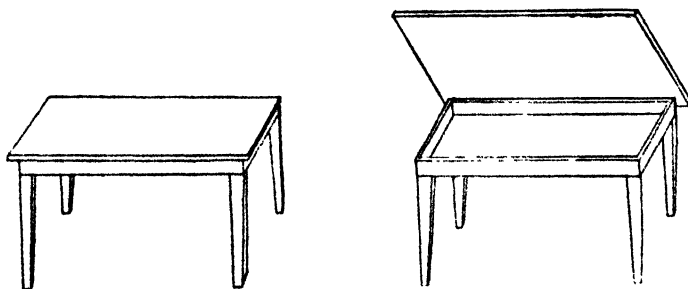
HOUSEHOLD CONVENIENCES.

During summer and autumn in our dry climate it is difficult to keep bread fresh and moist, even with the aid of earthenware crocks with close covers. An American farmer constructed a bread box on the following pattern, and his wife says that it beats all other contrivances:—



It is a box 14in. by 17in. by 18in. deep with a hinged lid on top, a grating about 5in. above the bottom, made of a perforated board, or laths or slabs, upon which the bread stands. Beneath the grating the good woman places a shallow dish with water in it, and the front part shuts up from hinges and makes the box close. The water in the dish keeps the air inside just sufficiently moist to prevent the bread from becoming dry.

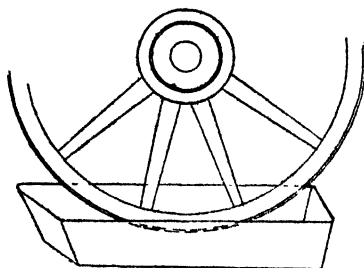
Another handy contrivance in a farmhouse where there is not a superabundance of room is a table with a lifting top, fitted with hinges. The two illustrations below give a fair idea of how the table should be made.



Instead of small drawers, which involve labor and fitting, the whole space beneath the table top is converted into a dust-proof shallow box, in which tablecloths, serviettes, and other table furnishings can be placed. Another advantage is that the table "napery" will not be creased and crumpled, as is often the case when stowed in a table drawer. Two "cabin hooks" are wanted to fasten down the front, and a good strong pair of hinges should be provided for the table top.

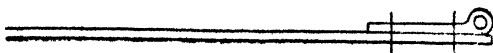
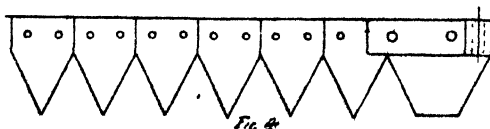
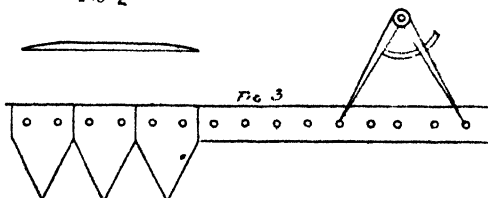
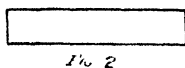
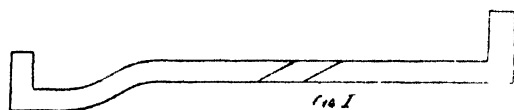
SOME HELPS FOR THE FARMER.

Loose tyres are not so common as they used to be when unseasoned felloes, spokes, and naves were employed in the manufacture of wheels; but still it would be worth while to prevent all danger of the tyres coming off where the wheelwright's shop is a good distance away.



The above shows portion of a wheel and a shallow trough, which should be of metal by preference and oil-tight. The wheel to be treated should be quite dry, and the rim should be revolved slowly in a bath of oil at a temperature of about 180° F. Each felloe should remain in the bath about four minutes, and the temperature must be maintained by aid of a fire beneath, and the greatest care taken not to greatly exceed 180° F., else the wood will be injured.

"How to Mend a Mower" is discussed in the *Blacksmith and Wheelwright*. The following illustrations are necessary to show how the work should be done :—



The notes refer specially to pitmans and sickles, and it takes a great deal of skill on the part of the smith to do this work as it should be done. If the pitman is half an inch too short or that much too long the sickle will choke in fine grass. To split one end of pitman and put the other end in it makes it hard to weld; besides, it leaves it too short, and has to be stretched, thus causing it to be weak. A better way is to scarf one end like welding iron. Take a rod of good iron the same size and weld them together; then cut the iron off short, scarf down, scarf the other end of pitman, and weld same as you would iron, only be careful not to heat the steel end too hot. There are advantages in this. First, an easy and solid weld; and, second, you don't have to draw the pitman to make it long enough. Fig. 1 shows the iron as welded in pitman.

The next is the sickle. They generally break just under the head piece. Take off the head and about three or four sections, set the compass as shown in Fig. 3, have break in centre of compass points, scarf both ends and stick together; then forge a piece as shown in Fig. 2. Forge to a feather edge at each end and put it over the lap in bar, and then weld; leave holes open where compass points are, take a heat or two, then try the compass. If there is too much iron don't hammer any edgewise, but trim off with a chisel. We now have the bar the same length, and a little heavier. Fig. 4 shows the sickle repaired.

PROVISION OF FODDER BY ENSILING.

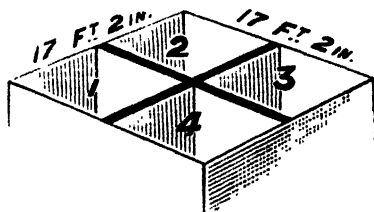
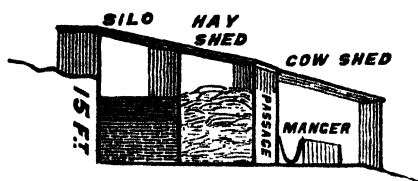
In order to keep up the supply of butter during the autumn and early winter months it is necessary that milking-cows should be provided with plenty of succulent food, or with the more costly bran, meal, cake, and similar commercial articles; and the good condition of other herbivorous animals cannot be maintained satisfactorily upon a diet of dry grass, hay, and straw. Such fodder is not easily digestible, and although it may show a considerable nutritive value by analysis, its nutritive quality is not perfectly extracted whilst passing through the digestive organs of the animals. It has often been asserted that, whilst 3 tons or 4 tons of green crop are required to make 1 ton of hay, the same quantity of green crop will make $2\frac{1}{2}$ tons to 3 tons of ensilage, and $1\frac{1}{2}$ tons of ensilage will maintain a cow or other animal for as long (and in much better condition) as the 1 ton of hay. If this be true (and there seems to be no reason to doubt it), then ensilage will support two animals where only one could be maintained where the herbage is converted into hay. The animal receiving an allowance of succulent forage—either greenfeed or ensilage—will certainly be more healthy, and butter from cows so fed will possess a better color and finer quality than would result where the animals have to subsist altogether upon dry food.

In Europe and America the necessity for ensilage has long been recognised, and it is practised by hundreds of thousands of farmers. If, then, it is considered so valuable an aid to economical management of farming in such climates as those of Europe and America, how much more essential is it to success that ensilage should be practised in Australia, where the natural green herbage lasts only about five or six months, and during the rest of the year all kinds of fodder are dry, deficient, and too often altogether absent.

To make perfect silage is very easy if ordinary care is taken. Pit silage is best for cows, and, when made, it is practically safe from fire, and will keep good for several years. Stack silage gives more waste, becomes very dry on the outside in time, and is not so good for cows as for dry stock. Pit silage is usually somewhat sour, whilst stack silage is aromatic or sweet. The difference

is brought about by the degrees of temperature which the fodder is allowed to attain before putting on weight or pressure. The heat is caused by fermentation, and fermentation can be stopped by preventing access of air. In the first place it is necessary to kill the germs of fermentation, or decay, and this can be brought about by the germs themselves. Fermentation causes a rapid rise of temperature, and when it rises to 135° F. all the germs are killed; then by excluding the air no fresh germs can gain access, and the fodder will remain good so long as it is kept under pressure.

The two illustrations below show how Messrs. G. & J. Perkins, of Woodside, arrange a silo on the side of a hill:—



The depth of the ensilage pits was 20ft. from top of wall, or 15ft. from soil level to bottom. Next to the silos there should be passages, then the hay sheds; another passage between the hay shed and the mangers. The ground plan will be thus:—



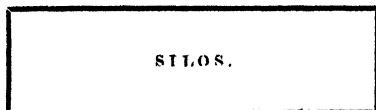
P A S S A G E .



P A S S A G E .



B A I L S .



P A S S A G E .



P A S S A G E .



B A I L S .

The plan on the right side of pit, marked 1, 2, 3, 4, was adopted by Mr. John Hutchens of Woodside. His pits were 17ft. 2in. each way and 10ft. deep, with masonry walls rising 15ft. from the bottom and 14in. thick, each compartment being 8ft. x 8ft. x 15ft., and holding 50 tons to 60 tons altogether.

Any edible plants can be made into silage, but a mixture of nutritious herbs and plants is much the better; for example—peas, vetches, oats, barley, wheat, rape, mustard, &c. The best time to cut the forage is when the seeds are beginning to harden, or a very little sooner. If cut when too succulent, or when quite wet with dew or rain, the temperature will not rise rapidly enough when the forage is placed in the pit or stack. It is usual to cart that which has been cut in the morning during the afternoon; and that which has been cut during the afternoon is carted in next morning, if not wet. During the night

the temperature rises sufficiently to require pressure to be placed upon the forage, and this is provided by putting on more spoil from the field. If the temperature is allowed to rise above 150° F., the silage will be blackened; if it does not rise above 122° F. it will be in danger of going wrong, therefore wait for the heat to increase; but if the heat registered is above 135° F. pressure should at once be put on, either in the shape of more green forage or by means of stones, logs, leverage, or otherwise. It is much the better plan to chaff the green stuff whilst filling the silo, but in any case it is desirable to trample down the outer margin of stacks or pits. Usually the temperature rises within twelve or sixteen hours to a sufficient degree to require pressure or weight being put on; but in order to be certain upon this point it is desirable to use a thermometer. A piece of iron pipe with a sharp-pointed plug can be forced down to the centre of the silage, and a thermometer can be wrapped in some soft substance and placed within the pipe before the plug is inserted. Leave the instrument in the silage for ten minutes, and withdraw and examine quickly. If the temperature is anything above 130° F. begin filling in more silage at once. When the pit or stack is completed put on any weights or pressure about twelve hours after. Pits can be filled up again and again as the silage sinks down, and stacks may be topped up with fresh green fodder. A well constructed silage pit would last for a century, and the first cost need not be very great. It may be made with red gum or jarrah slabs, or brick or concrete, but would probably last longest if built with stone. If the surface is cemented it will be perfect. Silos are often made above ground, usually of planks lined inside with tar-paper to prevent access of too much air. In this case the walls must be well braced or supported to resist lateral pressure. For weighting silage pits, kerosene tins filled with mortar or concrete are very handy, especially if a loop of iron wire is let in for lifting them on and off.

FARM NOTES.

Written for the "Journal of Agriculture and Industry."

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,
ROSEWORTHY, SOUTH AUSTRALIA.

There is at the present time a plethora of forage in the colony. Pastures are luxuriant; fields lying out to be fallowed next year are carrying a weight of vegetation, and the drought of the past three years has left a deficiency of stock to consume it in due course. The pastures may be wanted for summer feed, but on the fields to be fallowed next year the mower should be kept going from dawn till dark. On these fields the vegetation consists of geranium, dandelion, trefoil, wild oats, a few grasses, and weeds more or less vile. Saved now as hay or silage, a useful forage for the bare months at the end of the summer and early winter may be obtained, and even if it be not needed then the stack of grass hay or the silage now made can be left to tide over a future bad season. In our abundance now we must not be tempted to forget the ever recurring droughts of varying intensity, and it behoves us to save the fatness of the year for the lean year of the future, which experience should teach us to expect. Further, to mow these lying-out fields now is to save a seeding of weeds which years of cultivation may fail to eradicate.

One year's seeding,
Seven years' weeding.

The mower and the horserake may not secure all the seeds of weeds in these luxuriant fields, but so many will, I believe, be gathered, if the work be undertaken in time, that even were the forage as hay or silage quite valueless the

work would be well worth doing. To make the stuff into silage is the better way of cleaning the land, as the herbage is carted off green, and the seeds of weeds are not shed to the same extent as in hay-making, and further, the fermentation which it undergoes in the process of ensiling in the stack or in the pit brings about a condition that a large percentage of the seeds in it cease from troubling. Many no doubt survive, and one has accordingly to choose a suitable field in which to feed such silage; but fewer survive than if the herbage were made into hay. Even if it be made into hay dirty hay, if you will—there are a few acres on every farm where it can be fed with impunity; and this is certain, that if it be saved now it will be found at some future date when stock are pinched for feed a very welcome store to be opened. Leave that herbage unmown and ungathered, and in a few weeks the fields will be strewn with myriads of seeds of weeds, and in a few months we may ask of the winds for much of the feed that was in it. What is left will be dry and unthrifty for stock, sun bleached, or even rain bleached, for summer rains are not rare. It is urged earnestly therefore that as much as can possibly be overtaken with the mower before haytime proper is upon us should be secured either as grass hay or silage.

Ensilage.—We hear less of silage now than we did a few years ago. Although the practice of preserving green fodder in silos was known to the ancients, and in some parts of Europe held on through the intervening centuries, it did not attract much attention until less than twenty years ago. Then it suddenly sprang into prominence, and its fame seemed to be borne on the wings of the morning. Commissions sat and reported on its advantages, its merits were loudly extolled, and the still small voice of common sense was scarcely heard for a time. Inferior stuff ensiled was to make good nutritious ensilage; the nutrient value of good forage was to be increased, as it was to be made more digestible; silage was to prove equal to hay, weight for weight, and as the same quantity of forage will give three times the weight of silage that it will of hay, the gain by the process was to prove marvellous; and the weather at haytime was to become practically of no concern to the farmers. Credulous farmers received these statements without the necessary grain of salt, and deplorable messes resulted. I will give an example which I know to be fact. A worthy farmer—a colonel of militia—cut a beautiful and valuable crop of peas, and with immense fuss that the innovation should be known, had the crop piled in a huge ensilage stack in the corner of the field. The stack very soon became a muck heap—a nuisance to the district—and the disappointed colonel could only relieve his feelings by swearing heartily at science and all its applications to agriculture. He was no exception in blaming science for the losses which his own credulity and want of science occasioned. Sir John Lawes, Dr. Voelcker, and other real pioneers in the application of science to agriculture were busy issuing cautions while the boom was growing. The ensilage boom, like all other booms, of course burst, and accordingly ensilage literally stinks in the nostrils of some farmers. Its utility, however, remains, and as an item of farm practice it has its place, though by no means deserving the prominence claimed for it a few years ago by the more enthusiastic of its advocates. In this colony, where hay is so easily made, there is less risk of loss with hay than silage, for the latter requires much careful attention, and sometimes, even with the greatest care, turns out inferior. But silage has an advantage for dairy cattle in that it is more succulent and gives a better quality of dairy produce, as well as keeping the cows in a more healthy condition, and has the merit, as already stated, of destroying a large percentage of the seeds of weeds. I would recommend therefore that much of the self-sown abundance of forage now in the fields be converted into silage right away, and that the remainder be made into hay to be fed to horses when doing light work, dry cows, &c., when it is wanted.

Silage is made more easily and with less loss in pits than in stacks, but for special cases, as, for example, for the present superabundance of forage, stacks will suffice. Whether it be made in stacks or pits it is well to take some time over the work—to put in, say, 6ft. of forage and wait until the temperature rises to 125° F., so that the result, so far as it can be controlled, may be sweet silage, then add another few feet, and so on successively. If the temperature be likely to rise over 145° F. or thereabout, add additional weight of green stuff to stop the rise. When finished, and temperature has risen sufficiently, add the weights—stones, earth, concrete in kerosene tins—of whatever form available.

On the College farm we are now busy making silage of self-sown herbage, and hope to make 180 tons from a field from which the stock were removed some time ago when it was noticed that the season was likely to afford a superabundance of spring and early summer feed.

Fine cleaning weather is now prevailing, and as far as possible our scarifiers are being kept going on the fallows.

The coming month will be a busy one for haytime will be upon us very shortly, and before that time our summer crops have to be sown, sheep have to be shorn, and as much work as possible got forward to leave things free for harvest. We have fully 400 acres of fallow, and of this we propose to crop with fallow crops about sixty acres. I think this a sufficiency for the season, as stubbles are likely to be good, there being much flag to go down and more than an average amount of undergrowth. Our average rainfall being about 16in., I think it well to leave as much as possible of the fallow bare to avoid drawing off moisture by the summer crop. As I gain experience of the climate I appreciate more and more the practice of bare fallowing in the drier districts. I propose this year to put in a dressing of bonedust with the sorghum from 1½cwt. to 2cwts. per acre, not that I think it will benefit the sorghum much, but that it may be mellowed in the land and more available for the wheat that will follow the sorghum in May next. Bonedust in this dry district shows only slightly on the crop when sown with the wheat, but when applied now it will be more available when required. There is no risk of leaching during the interval, and if it help the sorghum in any way, so much the better, as the sorghum will be fed down on the land. We propose to sow amber cane, dhurra, early orange cane, and holcus in separate blocks that the maturing may be not all at once. About 4lbs. per acre or thereabouts will be sown in drills 24in. to 32in. apart. Many farmers have told me that they find it well to sow sorghum deeply—to plough it in, in fact. We will not plough in that we may not waste moisture, but will drill deeply. A little Johnson grass will be mixed with all our summer crop seeds, say, 2lbs. to 3lbs. per acre, as this plant is so very hardy and will often succeed when sorghums fail. Pie melons are also very useful on the farm, but as we are likely to have abundance of peas and silage I do not propose sowing melons much this season.

POULTRY NOTES.

By D. F. LAURIE.

Written for the "Journal of Agriculture and Industry."

Hints.

Breed only from the best stock. If for table purposes the breeding stock must be, firstly, of such breeds that, either pure or crossed with other breeds, the progeny shall be of the highest quality; secondly, breeds or crosses which have been proven as quick growers and rapid maturers. If egg-layers are required if possible keep egg-laying breeds noted as prolific, but in any case only "set" the eggs of the best layers.

Keep the young stock growing. Feed liberally on sound wholesome food; do not overcrowd. You will find it waste of time and food attempting to rear sickly or crippled chicks, &c.

Provide a constant supply of clean fresh water; the water vessels should occasionally be scalded to destroy germs. Keep the water carefully shaded; water which has been exposed to the rays of the sun causes dysentery and other ailments. Provide sharp sand and grit; also a supply of old mortar, crushed bones, and, where obtainable, crushed oyster or sea shells. Green food is a necessary item if success is expected. It is to be hoped that all readers have made provision for the dry season in the shape of kale, mangolds, or rape.

As the weather gets warm the birds, especially the young ones, will require protection from the hot sun. In the country, if no bushes are available, such shelters can be made of boughs on a light frame and secured with pieces of fencing wire, or old bags split and sewn together.

Guard against insect pests; it cannot be expected that vermin-infested poultry will yield a profit. Keep all houses, &c., scrupulously clean, and be not niggardly with the use of insecticides. Eschew the use of woodwork as much as possible in the construction of poultry-houses, as the cracks afford a harbor for vermin.

Preserving Eggs.

Very soon, in all but the cooler portions of the colony, the breeding season will be over. The thrifty will therefore consider the practicability of preserving a supply of eggs when the market price is low as provision for times of scarcity, or for sale as soon as a fair profit is visible. Two things have to be borne in mind, viz., that unless the eggs are quite fresh it is of little use preserving them, as the act of so doing will not regain their youth and freshness; also, and most important, infertile eggs are far better and more reliable than fertile. Therefore as soon as breeding is over pen up all male birds; the hens lay just as well without them. After, say, seven or eight days the eggs will be infertile. There are many methods of and agents for preserving eggs: in any case it is always well to store them in a cool cellar. Where fresh infertile eggs are obtainable they may be packed in powdered charcoal, sifted wood ashes, or well-dried salt, and will keep for many months; or they may be carefully smeared with fresh lard or vaseline, twisted in a square of paper, and packed in boxes or kerosine tins. This is as good a method as any and has been very successfully tried. The following extract from *The Field* is to the point:—“For several years I have watched the preserved egg class at the Birmingham Show, and I have noticed that no one particular method has been uniformly successful in procuring the winning samples. Sometimes a dozen eggs preserved in this way wins, sometimes in that, and from my observation of the class I am unable to say which method has been the most successful. The object of the recipes for the various methods and preparations seems to be to prevent air permeating the pores of the shell, and this is attained, more or less successfully, in various ways. Roughly classified, eggs may be preserved wet or dry. They may be immersed in some liquid preparation or packed in some dry material, or, further, they may be first wetted and then stored dry. Again, they may be treated collectively or separately. A hundred eggs may be put wholesale into a box or barrel, or each egg may have to be handled several times separately, so there is plenty of choice, depending on space and time. Here are a few methods, as described in the Birmingham catalogues or derived from other sources:—

“*Dry Methods.*—Packed in dry bran; ditto in a mixture of bran and sharps (pollard); ditto in salt, and ditto in sifted wood ashes. Then there comes the variation that some packages are made airtight by paper or linen being gummed or pasted over them; others are simply nailed or screwed down. Some add

that the boxes or packages are to be turned completely over once every week ; others do not require them to be moved. The following dry methods seem to require each egg to be separately handled at least once, and sometimes twice or thrice, namely : coating or painting the egg with (a) white of egg, (b) gum, (c) oil, (d) beeswax rubbed on the egg or melted, and the egg dipped in the solution, (e) grease, (f) buttering, and then wrapping it in paper and packing away. In some cases, it is added. the eggs should be packed in sawdust, bran, or flour.

" *Wet Methods.*—Lime seems the basis of these various pickles, to which salt is sometimes added. A strong solution of boracic acid and water also produced a successful sample, but I could not ascertain the exact proportions (2ozs. or 3ozs. to the gallon). This is the recipe of a pickle which will preserve eggs for several months in good condition for cooking, namely :—One gallon of soft cold water, 1lb. of quicklime, 6ozs. to 8ozs. salt, 1oz. cream of tartar. Mix the lime and water in an earthenware jar ; when cold add the salt and cream of tartar. A thin film forms on the surface of the fluid and the mixture should occasionally be stirred up, even while the eggs are in it.

" Handling each egg separately means the expenditure of a good deal of time and trouble when anything like a large number has to be dealt with ; so, although better results seem to reward careful and separate treatment of each egg, yet the gain is so small as scarcely to warrant the extra trouble and labor. Therefore, on the whole, for ordinary household purposes I am inclined to recommend packing the eggs carefully in layers embedded in good bran in boxes a convenient size to easily handle. When full the lid should be securely closed by gumming or pasting strips of paper or linen over the joints, also over any cracks or divisions in the wood, and finally the boxes should be stored in a cool, dry, even temperature, and turned completely over now and then ; or the lime pickle, for which I have given the recipe. When this is mixed nothing more should be done than putting in the eggs. Three very simple matters very materially contribute to success in keeping eggs, namely :—(1) The eggs should be very fresh when treated ; (2) the eggs should be carefully collected, neither shaken nor rolled about ; (3) the eggs should be sterile (infertile), and this is the most important of all."

A method much recommended at present is dipping the eggs in a solution of waterglass : a solution of silicate of lime much used in the manufacture of artificial stone. Waterglass is cheap and can be ordered through any chemist, It has this disadvantage, however, that as it completely closes all the pores of the egg shell, it is necessary to prick each egg with a needle before boiling to prevent it cracking. The most successful method is smearing with lard or vaseline ; from personal experience I thoroughly recommend it. I know a farmer who made excellent profit by selling "fresh" eggs in the dear season.. He packed in dry salt, well dried in an oven, and used kerosene tins. Eggs should be packed on end, preferably the large end. When they are intended for sale all greased or stained eggs should be washed and dried, and then carefully examined with a strong light, or by the aid of the sun, so as to be sure that they are in a sound condition. I shall be very glad if readers who may adopt any of these methods will kindly forward results later on. I should suggest the following particulars :—(1) State if fertile or sterile (infertile), (2) method adopted, (3) age of eggs, when treated, and date, (4) where stored (if in cool cellar), (5) date of various trials or examinations, (6) any other particulars, such as thickness of shell, as thin-shelled eggs, being deficient in lime, do not always give the best results. These trials would form a great object lesson, and further, there is plenty of scope for more to undertake the business profitably than are likely to do so. Eggs stored in a cool chamber turn out in excellent condition, as was proved recently by Messrs. Thyer & Co., of Weymouth street ; still everyone has not such conveniences.

NOTES.—I am a diligent reader of the *Journal of Agriculture*, and am very pleased to notice that at several meetings of Branches of the Bureau members are devoting time and thought in the preparation of papers on poultry. In making a few remarks thereon I trust they will be accepted in the spirit they are offered.

With regard to the paper read by Mr. Leonard, at Boothby, it might be admitted that, as he says, screenings make poor food for horses; the same remarks apply if you substitute the word "fowls." Feed on good sound food. A cross between the Spanish and Light (not White) Brahma may lay well, but eats far more than a Leghorn or Minorca, and never lays as well, and cannot rank as a table fowl except as of inferior quality. Crossbreds are not necessarily the best; sometimes they are more profitable, especially as regards table fowl, but they must be first crosses, the progeny of pure parents. *Re* the rabbits, I know several who breed ducks and fowls, &c., for market, and make more than 10d. to 1s. profit out of each bird.

At Millicent Mr. Foster writes after my own heart. However, he takes exception to the remarks of some poultry writers that the Indian Game-Wyandotte cross is excellent for the English market. I have seen many splendid specimens of this excellent cross, and am further strengthened by the opinions of leading experts in the other colonies who well know the English market. We none of us said it was the cross *par excellence*—that is what the Old English Game-Dorking and Indian Game-Dorking produce.

At Pine Forest the opinion was expressed that pure-bred fowls were more susceptible to disease than the common barn-door fowl. This is not the experience of others. Look at the thousands of experienced practical men throughout the world who make the greater part of their living out of poultry, and who have none but pure breeds. The fault rather lies in the fact that so many pure-breds are kept under insanitary conditions, and because all sorts of rubbish is sent out to the country under the name of pure-bred poultry.

At Tatiara Mr. Stanton says that 100 fowls in any house is enough. It is too much: experience has proved that fowls in mobs of from thirty to fifty at most give the best returns. Do not sprinkle quicklime about if the fowls eat it, as they often do; peritonitis may result; use slaked lime.

At Narridy Mr. Wyatt refers to the Malay-Partridge Cochin cross. It is large, and in addition to the yellow skin is very coarse; it is not a rapid maturer, and quite unfit for export. Give the green food daily if obtainable. Beware of cayenne pepper; it promotes liver disease.

DAIRYING.

BY G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

Bacteriology.

Concerned as we are with the industry of dairying, the science holding foremost rank is that of bacteriology. To the researches of such eminent dairy scientists as Duclaux, Freudenreich, Conn, Weigmann, Fleischmann, and Lloyd we are greatly indebted. In looking back to the days of Pasteur, who laid the foundation of the great science, and successfully crushed the long-standing erroneous theory of spontaneous generation, we can note the progress of the science. No industry is more closely associated and dependent upon the influences of bacteria than that of dairying, and no better field is open to the scientist for further research than the produce of the dairy. Our future successes are greatly dependent upon the extension of bacteriological knowledge whereby more profitable results will be gained, especially in the ripening of

cream and cheese and prevention of injury to all our fermentative products. Pasteurisation, sterilisation, and refrigeration are progressive systems adopted to retard and destroy bacterial multiplication. Preservatives are resorted to where mistake, neglect, or unavoidable circumstances have favored the undue presence of bacteria. The subject of dairy bacteriology is of great magnitude. In this article I will endeavor to treat the subject in a brief and practical manner.

Bacteria are the smallest known living organisms, and can only be observed when brought under a strong magnifying power. At present bacteria are generally included in the vegetable kingdom, resembling the algæ, possessing no chlorophyll.

Structure.—Owing to minuteness of size it is a difficult matter for scientists to give an accurate description of the parts. The outer covering constitutes the skin or membrane; the inner part contains a substance known as protoplasm or living matter.

Shape.—The shape varies with the different species. The bacterium is short and rod shaped; bacillus (plural, bacilli) is of moderate length; spirillum (plural, spirillæ) is of corkscrew appearance. Some are to be found singly, in pairs, in chains, and in bunches. Other forms have whip-like bodies to facilitate locomotion.

Reproduction.—Bacteria principally multiply in two ways: first by fission or splitting. The microbe elongates itself, and then divides in such a way as to form two independent bodies able to reproduce themselves. Their rate of multiplying under favorable conditions is extraordinary. Assuming one single form divides into two in one hour, four in two hours, eight in three hours, at the end of twenty-four hours over sixteen millions would be formed. The other form of reproduction is by the formation of small bodies called spores, which differ from the adult cell by having a harder and stronger protective membrane.

Spores can thus withstand and be even favored with conditions fatal to non-spore-forming bacteria. Spores are of two kinds—internal spores (endogenous) and joint spores (anthrospores). In the bacillus the protoplasm changes into contractile bodies, bursting the membrane, and the liberated spores afterwards develop into new bacilli. In joint spores a cell becomes formed at the end of the bacillus, gets detached, and changes into a spore. With suitable circumstances this spore germinates into a fully-developed plant. Those resistible bacteria readily assume the above form when danger threatens them, as when food is scarce, when moisture is scarce, when temperature is too high or too low, and when poisonous matters are about. Unfortunately for the dairy industry, spores can lie for a lengthened period in a dormant form and await favorable conditions to develop.

Conditions Influencing the Development of Bacteria.—A highly suitable medium for the multiplication of bacteria is milk, possessing in a soluble and available form the essential food constituents for their maintenance and reproduction. Bacteria require oxygen, carbon, water, and mineral salts; most of them also require nitrogenous diet. Degree of temperature is important, about 95° F., or the temperature of freshly-drawn milk being found most favorable. The principal forms with which we have to deal with in milk and cream require air, and they are classed as aerobic; some found in the heart of cheese and butter and living without air are called anaerobic. The butyric spore-forming bacteria may be cited as an example of an anaerobic ferment. These are what are termed obligate and facultative aerobic and anaerobic forms. For example, the bacillus of symptomatic anthrax and lockjaw can only live in the complete absence of oxygen; therefore they are obligate anaerobic, and those classed as facultative aerobic can survive for a long time without oxygen.

Occurrence of Bacteria.—Bacteria are found wherever organic matter is present. On the top of the highest mountain and in the air above the sea it is possible that they may not occur. In the air in the streets of our towns we have millions, and one scientist has calculated 4,000 to be present per cubic yard in the air above the streets of Paris. With rain and heat in Australia the bacteriological action in the soil must be excessive. Adhering to dirt, bacteria are transported in clouds of dust by the wind, and are carried into our unprotected dairy products. Water exposed to the air or in shallow wells, without proper protection, contain great numbers of bacteria.

Source of Bacteria that Contaminate Milk.—It is understood in scientific circles that milk in the udder of a healthy cow is sterile, that is, free from the presence of bacteria, and that contamination with germs must come from external sources. Every ounce of milk when drawn from the cow generally contains hundreds of thousands of living germs. In a few minutes after milking from 60,000 to 100,000 have been found in $\frac{1}{4}$ th of an ounce of milk, and in the same quantity at the end of six hours their extraordinary multiplying rapidity may be calculated to increase their number from two to six millions. Many of them curdle the milk, due to acid formation; some are unable to make sufficient acid; many produce an alkaline reaction; many make a rennet-like substance, which coagulates milk; many have little or no influence over milk. Some flourish at a high temperature—104° F., others at 80° F., and some at little above freezing point. Many produce bad flavors in milk, and a few produce good flavors, as used in the ripening of cream. Some multiply with great rapidity, and some very slowly. To obtain milk free from bacterial contamination is impossible, as the milk ducts at the close of every milking will contain milk adhering to their walls. Air is admitted into the ducts, the entrance of dirt is not prevented, temperature is suitable, and altogether a magnificent harbor is afforded for the germs to breed. Should the air surrounding cattle be impregnated with pathogenic germs, they can be transferred to the udder, enter the ducts, become extremely numerous in the latter place, and, at the operation of milking, be washed and fall into the milk pail to continue their multiplication. The first drawn milk from a cow was proved to contain bacteria to the number of 83,000 per cubic centimetre; at the middle of milking considerably less, an average of 9,000 per cubic centimetre; and at the close of the milking no bacteria were present. To extend the keeping quality of milk it is advisable not to permit the first washing of the ducts to pass into the milk pail, but to be collected together, thrown away, or boiled and given to the pigs. Another source of contamination is the dirt upon the udder and around the teats. Soxhlet carried out an experiment exemplifying the influence of cleanliness in milking. A cow which had been exposed to dirty surroundings was milked without any attention to cleanliness of the udder, and the milk coagulated in fifty hours when kept at a temperature of 60° F. Placing the same cow under cleanly conditions, the milk only coagulated at the end of eighty-eight hours, at the same temperature. Milk vessels when unsterilised are another source of contamination. Steaming or scalding with boiling water should always be done after washing, followed by exposure to the air and sun when found practicable. The hands and clothes of milkers are another grievous source of milk fermentation. The water with which milk is too frequently diluted has given rise to the spread of disease, the milk becoming contaminated with pathogenic germs, such as those of typhoid fever. At the present time, if an average sample of milk is taken and allowed to settle, a sediment may be collected, and this sediment is purely dirt carelessly admitted into the milk. The unsatisfactory condition in the keeping quality of milk will continue as long as this state of affairs exists. Anyone who has noticed the conditions under which cows are milked, and the after treatment the milk receives upon

the average farm, will readily understand the cause of rapid souring. From what has been said we may regard the external conditions, as connected with the cow, as the greatest and most important source of trouble. We must not forget, however, that milk is contaminated with bacteria when the udders of cows are suffering from inflammation. This has been demonstrated by a number of experiments, and should the bacteria possess a pathological action inflammatory disease may be conveyed to man. Klein has shown that cows sometimes suffer from diphtheria, and when the milk glands become affected the milk is liable to impregnation with the diphtheria germs. Some observers are led to believe that the same is true in regard to scarlet fever. In the case of tuberculosis in the cow, the Royal Commission in Great Britain carried out the following experiment with milk from cows with diseased organs and diseased milk glands:—Thirty-eight guinea pigs and rabbits were inoculated with the milk from cows having diseased organs, but with healthy udders, and none were affected; forty-one were fed upon the milk, with the same result; twenty-one guinea pigs and rabbits were inoculated with the milk from cows with diseased udders, and all died; twenty-seven were fed upon the milk, and nineteen died in twenty-eight days after commencement of feeding. Such an experiment gave evidence that milk is contaminated with the virulent germs of consumption when the glands of the udder are diseased.

Colors in Milk.—Blue milk is caused by the bacillus cyanogenus, this color only taking place when the acid-forming bacillus is present. The formation of blue milk is an example of symbiosis, which is the association of several species to produce some special effect. Red milk is caused by the Micrococcus prodigiosus; yellow milk by the bacillus synxanthus; violet milk by the bacillus violaceus. Ropy, bitter, alcoholic, and many other faults are attributed to bacteria. By the researches of Babcock and Russell we are led to believe that milk in the udder of cows contains enzymes, unorganised or chemical ferments, and it has been already demonstrated that many bacteria in milk, especially those that gain access to the same from particles of filth and manure, are capable of elaborating chemical ferments with a coagulating property. Milk taken from the cow under sterilised principles and immediately afterwards subjected to the action of anaesthetics, as chloroform, ether, or benzole, showed signs of coagulation, and with a digestible property upon the casein. Cheese impregnated with those anaesthetics also gave evidence of unorganised ferments, and the analyses of separated slime have further convinced one of their presence, knowing that enzymes attach themselves to finely-divided material when in solution.

Lactic fermentation—The souring of milk and cream is the result of the action of lactic ferments. Over one hundred species have been described as producing the acid fermentation of milk. The principal food of those troublesome, although useful, ferments is the milk sugar which they are able to break up into carbon dioxide gas and lactic acid, and the curdling of the milk or cream is caused by the action of the acid. In the hot summer months souring takes place with great rapidity, due to the high temperature being favorable to rapid multiplication of the germs. With this high temperature, and returning to Soxhlet's experiment, one is more convinced of the care necessary to extend the keeping quality of milk by preventing contamination with dirt. In the ripening of cream we are dependent upon the action of this class of bacteria, and when care as to cleanliness has been exercised the flavor of butter is enhanced by what we may term the exclusive action of the lactic acid ferment. The name of *Bacillus acidilactici* is given to the common species, although it has been found to assume many varieties. The life of those manufacturers of acid and ripeness of milk and cream ceases to exist when a certain degree of acid has been reached, 0.8 of 1 per cent. proving fatal. Cream at this stage

we find by experience to possess the maximum degree of ripeness for churning, and to the production of long keeping and superior flavored butter. The degree of safety may be regarded as 0.7 of 1 per cent., and beyond 0.8 of 1 per cent. of acid, milk, and cream, will exhibit a liquefying tendency, becoming increased as time extends, and acquiring an unpleasant smell and taste; but this is the work of other bacteria which develop after the death of the lactic acid ferment. The necessity of churning cream prior to the action of injurious ferments which must be at work when the product is kept for an extended period will at once be seen. In factories where large bodies of cream are received the alkaline test, as described in the cheese paper, may be profitably adopted. An example of a class which thrive in a strong acid media is the butyric bacilli. They impart to milk or cream a strong bitter flavor readily observed in rancid butter. By the above it will be observed that the lactic acid ferments, although useful, are the forerunners of other bacteria of a harmful nature.

Butter.—In butter-making with well-ripened cream a more perfect separation of the caseous matter is obtained in the churn through the action of the acid liberating the casein from the fat. Less washing of the butter grains is necessary to furnish perfect removal of this bacterial food, and consequently the flavor of the butter is not endangered. Where buttermilk is left in the butter the duration of the superior flavor will be short, as the butyric ferments will multiply and rapidly cause rancidity by the formation of butyric acid. Ripening of cream may be defined as a bacteriological and chemical change whereby desirable ferments of the lactic acid group utilise milk sugar as a food, returning lactic acid to exert a souring and thickening influence over the cream.

Cheese-making.—In cheese-making success is dependent upon bacteriological and chemical changes. With injurious germs in the milk rapid growth will ensue, owing to the favorable temperature during the process of scalding. Many cheese faults are attributed to bacteria. For example, sponginess, brought about by a species of bacteria found in bad water and in filthy soil. Where these conditions exist around dairies the udders of cows cannot escape contamination with dirt having those bacteria, and with careless milkers and dirty surroundings worry to the cheesemaker will continue. In cheese-ripening we owe to bacteria the changes from a new indigestible curd to a mellow digestible food. In ripening rooms suitable temperature is necessary to the ferments; when too low in the winter months bitterness in cheese is often the result; when too high in summer, with uninsulated rooms, rapid ripening takes place, which requires skill in judging the period for disposal of cheese.

Pasteurisation.

Pasteurisation is a process of heating employed to extend the keeping quality of milk by killing and retarding germ life. Pasteurisation is frequently confounded with sterilisation, which claims complete destruction of bacteria by the action of high temperatures. In some cases temperature is demanded far beyond the boiling point before the vitality of spores is destroyed. Some species can endure a temperature above 300° F., combined with a high pressure of steam, and others can lie in the resting stage at a temperature much below freezing point. Spore-forming bacteria as the bacillus of tetanus or lockjaw, and the bacillus subtilis (hay bacillus) and other resistible forms associated with fermentative foods as silage, brewers grains, &c., are frequently found in milk. The majority of pathogenic or disease causing germs are of the common non-spore-making class, and accordingly offer little resistance to heat, which enables their vitality to be destroyed at temperatures without having an

injurious effect upon milk. Pasteurisation frees milk from the germs of consumption, the tubercle bacilli being unable to withstand a temperature of 185° F. for one minute. This temperature may be reckoned as the maximum degree of pasteurisation. No injurious influence is conveyed to the milk solids by this system, and although a temperature of 165° F. coagulates the albumen, the small percentage of 0.25 is very trifling. The albuminoid flesh-forming constituent of importance is casein, which averages 3.5 per cent., and this substance fortunately escapes any perceptible injury. The benefits upon the globules of fat is to decrease their grouping influence, and thus render the most valuable solid in a more easily digestible form. This important ingrouping of fat globules is characteristically brought out in pasteurised cream owing to the high percentage of fat. In New York city the mortality amongst children, principally due to intestinal complaints, has considerably decreased following the introduction of a system of pasteurisation. When milk is treated above the boiling point for thirty minutes it is termed sterilised; but sterilisation has a detrimental effect upon the milk solids, decomposing the sugar, coagulating the albumen, partially decomposing the casein and rendering insoluble the lime salts. Sterilisation and pasteurisation can be done upon the intermittent process, as lowering and raising the temperatures afford the ferments an opportunity of developing, followed by death at their weakest moments. When pasteurised milk or cream is immediately refrigerated over a large surface, the thin layer becomes exposed to the low temperature of the refrigerator or cooler, throws off bacterial gases and odors, the oxygen of the air has a full command of the film, oxidises and burns into harmless compounds otherwise injurious substances. Not only are these benefits derived, but spore-making and highly resistible bacteria when present in the milk receive a check upon their further reproduction. In the hottest summer months pasteurised milk will keep thirty hours longer than ordinary milk with a temperature of 60° F. after refrigeration. With pasteurised cream for butter-making it is necessary to ripen by means of a culture or starter. Why this should be necessary is because the lactic acid germs are killed and arrested, and ripeness would be interfered with by the growth of unwelcome forms escaping the pasteurising temperature. A starter can be prepared by taking buttermilk from a churning where butter of a high standard of aroma and keeping quality is made. Put a portion of fresh buttermilk into a few gallons of pasteurised skim milk at a temperature of 60° F., and allow to thoroughly ripen. Varying quantities of the starter are added to sweet cream to bring about ripeness in a given time. The bacteria in this buttermilk will predominate in the uninvaded cream, and produce its superior flavor afterwards to be found in the manufactured butter. Discoloration in cheese may be overcome by ripening the milk by means of a starter, and many injurious flavors are removed by the process.

Preservatives.—Many chemical substances are put into dairy produce to exert a preserving property, the most commonly used are bicarbonate of soda, boracic acid, salicylic acid, quicklime, formaldehyde, hydrogen peroxide, and sometimes corrosive sublimate. For the preservation of milk and butter all authorities unite in emphatically condemning the use of the above substances, especially those possessed of marked injurious properties. We know that substances which are poisonous to living protoplasm are likewise to bacteria, but the experiments of Lazarus show that by the addition of boracic acid to milk curdling is not deferred, and its action against pathogenic germs proved of little consequence. Where suspicion is aroused as to the use of acid preservatives the alkaline test will be valuable as a means of detection. Many of the preservative powders sold under proprietary titles contain boracic or boric acid, salicylic acid or formalin as the active ingredients. Generally the class of substances sold are antiseptic in their action, but in some cases, as in formalin, death to bacterial life is produced.

When butter is well made and free from buttermilk preservatives are not essential to its keeping quality, but when used are injurious to the reputation of the purity of the butter.

Butter Factories—The insanitary condition of butter factories is very often a source of trouble in the manufacture of first-class produce. The factory ought to have an elevated position for perfect drainage, and be provided with a supply of pure water. Thorough ventilation and free access of light is essential to purity of air and sweetness of utensils. Strong light, with its antiseptic properties, retarding the growth of bacteria, should have admittance into butter and cheese-making rooms. Drains ought to be trapped on outside and receive regular scalding with boiling water, followed by the treatment of an antiseptic or disinfectant. It is preferable to have floors of concrete or stone slabs with a fall of at least 3in. in every 6yds. In cheese-making rooms it is possible to lower the temperature in summer by insulated walls and providing for free circulation of air.

Dairy Calculations.

To the factory manager, dairy farmer, and cheesemaker a slight knowledge of dairy calculations is necessary, and the following will be found of value:—

If a herd of twenty dairy shorthorn cows give a yearly average of 600galls. of milk each with 3·8 per cent. butter fat and a herd of twenty Jersey cows give an average of 450galls. with 4·2 per cent. butter fat, from which herd would you expect to obtain the most butter, and quantity of milk in each case would be required to make 1lb. of butter.

1st. Deduct $\frac{1}{2}$ per cent. butter fat for loss in separation and butter-making. Pure butter contains about 86 per cent. fat. Then if 86lbs fat give 100lbs. butter, what will 3·55lbs. fat give?

$$\begin{aligned} 86 : 3\cdot55 &:: 100 : \pi \\ \pi &= 4\cdot13 \text{ approx.} \\ 100 : 12,000\text{galls.} &:: 4\cdot13 : \pi \\ 100 : 123,840\text{lbs.} &:: 4\cdot13 : \pi \\ \pi &= 5,114\cdot5920\text{lbs. of butter.} \end{aligned}$$

2nd.—

$$\begin{aligned} 86 : 3\cdot95 &:: 100 : \pi \\ \pi &= 4\cdot59 \text{ approx.} \\ \text{then } 100 : 9,000 &:: 4\cdot59 : \pi \\ \pi &= 4,263\cdot192\text{lbs. of butter.} \\ \text{Difference in favor of first herd} &= 851\cdot4\text{lbs.} \end{aligned}$$

To find the quantity of milk required to make 1lb. of butter. If 12,000galls. produce 5,114lbs. of butter, how much milk is required to make 1lb. of butter?

$$\begin{aligned} \text{1st—} \quad 5114 : 1 &:: 12000 : \pi \\ \pi &= 2\cdot3\text{galls.} \\ \text{2nd—} \quad 4281 : 1 &:: 9000 : \pi \\ \pi &= 2\cdot1\text{galls.} \end{aligned}$$

Butter Fat Test—The Babcock test is recognised as the most valuable means employed in factories for ascertaining the percentage of fat in milk. A well-shaken sample of milk is taken, and by means of a glass pipette 17·5 C.C are delivered into the test bottles, 17·5 C.C of sulphuric acid of specific gravity 1·832 is measured and added to the milk; the test bottles are shaken with a rotary motion, in order to effect a thorough mixing. The action of the acid is to hold the casein of the milk in solution, and if too weak there will be a mixture of the fat and casein, resulting in an incorrect reading; if too strong, the acid will cause an accumulation of matter beneath the fat by its action upon the milk sugar. The bottles are now put into the machine, having an inch or two of water at the bottom, temperature not under 160° F. Machine is worked for five minutes at a speed recommended by the makers, varying from 600 to 1,000 revolutions per minute. Bottles are now filled up to the neck with hot water, 160° F, worked for two minutes, more hot water is added in order to afford a reading of the fat, and the machine is turned for one minute. By means

of a preservative milk can be corked in bottles for a number of days, until convenient to test, and the result will not be affected as long as the milk remains in solution.

Rennet Test.—Good rennet should have a strength of 1 to 8,000, *i.e.*, one part will coagulate 8,000 times its volume in sixty minutes. Supposing 96galls. of milk are coagulated in sixty minutes with 36 C.C. of rennet, temperature 95° F., the strength is ascertained by multiplying the number of gallons by 4½, *i.e.*, the number of litres in a gallon and the product by 40,000. This is divided by the number of minutes in coagulation multiplied by the number of C.C. of rennet.

Example:—

$$\frac{96 \times 4\frac{1}{2} \times 40,000}{36 \times 60} = 8,000$$

By substituting the number of minutes in the above formula by 8,000 we can ascertain the quantity of rennet required to coagulate a given quantity of milk in a given time

$$\frac{96 \times 4\frac{1}{2} \times 40,000}{60 \times 8,000} = 36 \text{ C.C.}$$

To calculate the time of coagulation substitute the number of minutes by the number of C.C.'s.

$$\frac{96 \times 4\frac{1}{2} \times 40,000}{36 \times 8,000} = 60 \text{ minutes.}$$

Given 50galls. of milk at a temperature of 80° F. If 10galls. are taken out what temperature must this be heated to in order to bring the whole body of milk up to 84°?

Multiply the number of gallons by the difference in temperature, divide by the number of gallons taken out, and add the answer to the first temperature. Thus:—

$$\frac{50 \times 4}{10} + 80 = 100^\circ \text{ F.}$$

How many gallons at 120° F. is required to heat up 50galls. from 80° to 85° F.?

$$\frac{50 \times 5}{120 - 80} = \frac{250}{40} = 6\frac{1}{4} \text{ gallons}$$

If 50galls. of milk is removed from 100galls. at 90° F., what temperature must it be reduced to in order to bring the bulk of milk to 85° F.?

$$\frac{100 \times 5}{50} = 10 - 85 = 75^\circ \text{ F.}$$

CURCULIO BEETLE.

J. D., c/o Co-OPERATIVE STORES.—The insects forwarded are curculio beetles. They are nocturnal feeders, and may be trapped by going out at night without a light and noiselessly placing a sheet or paper beneath the tree, then give it a sharp tap, and the beetles voluntarily loosen their hold to the limbs or leaves and drop to the ground on to the sheet. They can then be destroyed by boiling water. A better method is to get some Paris green and dust it over the tree lightly, taking care to touch beneath the foliage, or it may be used 1oz. in 4galls. of water as a spray if ½lb. of fresh lime is slaked and added to prevent injury to the foliage. —(G.Q.)

DRESSING FOR SHEEPSKINS.—Take 7lbs. arsenic, 6lbs. washing soda, 10galls. water; boil till arsenic is all dissolved. For use, take half a pint of this solution and mix with 8pts. water. Apply with a brush. Stretch the skin as squarely as possible, and dry in the shed.

FIGHTING INSECT PESTS AND FUNGUS DISEASES.

Notwithstanding all that has been printed and all that has been spoken by specialists upon these subjects there is still a lamentable absence of knowledge amongst gardeners and fruitgrowers concerning the insects and fungi which may seriously endanger their chances of securing marketable crops. There are a few persons amongst them who have learned a good deal upon these subjects, but there are many who apparently cannot distinguish between a parasitic fungus and a predaceous insect, and not a few seem to be convinced that every moth they find is a codlin moth however greatly it may differ from that insect. It is of no use to tell them that the caterpillars of the codlin moth attack only fresh pears, apples, quinces, and (very seldom) apricots, peaches, and plums—they declare that they have found the codlin moth by thousands amongst potatoes, tomatoes, dried fruits, and even on cabbages and stringybark trees. Of course better informed people know that the potato moth is quite distinct from the codlin moth, and that the moth attacking dried fruits is again distinct from either.

It is very desirable that every person engaged in horticulture should be able to distinguish between beneficial and injurious insects, and, again, to know the difference between the two classes of injurious insects and the two divisions into which the parasitic fungi have been divided.

Of course, the beneficial insects are those which are "carnivorous," or insect-eating, and it often happens that these are far more voracious in their larval or "grub" stage of existence than when fully matured. Thus the grubs of several so-called "ladybirds" are perfect "ghouls" in respect to aphides, whilst others attack scale insects. The syrph flies, or "hoverers," and several others affix eggs on the bodies of caterpillars, scale insects, &c., and the larvæ from those eggs enter the bodies of their victims, so that millions are thus destroyed. A knowledge of these beneficial insects would cause a sensation of pleasure to fill the breast of the well-informed horticulturist when he sees them in numbers about his plants and trees, but the same insect may raise a scare in the mind of another who is unable to distinguish friends from foes.

But it is equally important to be able to classify both the injurious insects and the parasitic fungi because the poison that would destroy the gnawing insect would have no effect upon the insect which sucks out the vital juices of the plant. Again, in the treatment of fungus parasites there are some which live only upon the outer surface of the plants whilst others live within the tissues of leaves and fruit, and each class requires a different treatment.

The insects which eat the substance of the leaves or the pulp of fruit can be poisoned by applications of Paris green, London purple, hellebore, arsenite of lime, &c., to the surface of the leaves or fruits liable to be attacked. Of these poisons the arsenite of lime appears to be the cheapest, the most easily applied, and quite as effective as any. Formulæ for preparation and instructions for application of insecticides and fungicides can be procured at the office of the Agricultural Bureau or will be posted to any address if stamp for postage is enclosed with application.

Insects which suck out the sap of plants such as plant lice (aphides), bugs such as the "soldier bug" (*Myctis symbolica*), and the various scale insects may best be dealt with by using a spray of resin wash, or tobacco and soap decoction, or kerosene emulsion, each of which is more or less effective according to the way in which applied, or they may be killed by fumigating with hydrocyanic acid gas.

Fungi which live within the tissues of leaves and fruit can only be prevented by winter sprays of extra strong Bordeaux mixture or with some other chemical

when the trees are about to start fresh growth; but the further spread of such fungi may be stopped by spraying much weaker mixtures, which will not injure the foliage if applied at a proper temperature and at the right time. Fungi like the oidium of the vine, which live on the surface of the leaves, can be destroyed by means of sulphur fumes.

It is easy to decide which class of insecticide should be used. If the leaves or fruits of any plant or tree are gnawed or perforated, use Paris green or other *insoluble* arsenites. It is very important to recognise that the poison must be insoluble in water. Thus, if arsenic is dissolved with soda and water, and applied to plants, it will kill them; but if a good quantity of freshly-made lime is mixed with the soda and arsenic solution the arsenic combines with the lime, and then the arsenic does not dissolve with the water, so that when applied to trees it does not injure them; but when eaten along with the leaves or fruit by the insects the arsenic is again separated by the acids of their digestive organs, and causes them to die. The same remarks apply to Paris green, and London purple combinations of arsenic with copper, &c

But the insects which live by suction—which drive their beak or rostrum into the substance of the leaves or fruit, just as the mosquito or the flea drive their beaks or sucking tubes into the flesh of animals—and abstract the blood or the vital juices cannot be killed by poisons spread upon the surface. They must be attacked with some sticky or oily substance that will close up their breathing organs, such as resin wash, or kerosene emulsion, or with something that will suffocate, or burn, or otherwise get rid of them. It is of no use whatever to try poisons on this class of insects; but some of the other class may be destroyed by the same remedies that will kill the aphides, bugs, &c. The necessity is placed upon the horticulturist to “fit the remedy to the disease,” and he can only do this when he has made himself competent by careful observation to decide whether he has to deal with a gnawing insect or a sucking insect, or with either a surface-living or a substance-infecting parasitic fungus.

FRUIT FLIES.

BY CLAUDE FULLER, F.E.S., DEPARTMENT OF AGRICULTURE,
CAPE OF GOOD HOPE.

In the July number of this journal reference was made to the two species of fruit flies or fruit maggot flies—as our more learned friends have it—that are attracting the attention of Australian orchardists, particularly those of New South Wales and Western Australia. The consideration of these insects involves several interesting questions, and I trust I may be pardoned for drawing attention to them in so purely a practical publication as this. The first relates to possibility of a life zone or limit to the geographical distribution of the Queensland species (*Tephritis Tryoni*). It is of course difficult, on account of the more or less general uniformity of the climate, to draw any hard and fast lines defining the limits to the distribution of insects, particularly imported species, in the island continent, and this difficulty is enhanced by our still meagre knowledge of the distribution of native forms. I would, therefore, in referring to these matters, like to make a plea for a systematic demarcation by some local student, whose knowledge of the flora and higher fauna is such as to render him competent, of such limits as may now be known, so that as time goes on and our knowledge increases the work may be added to and rendered more and more valuable.

The practical worth of such a knowledge of life zones has been discussed ably by Dr. C. Hart Merriam in the 1894 Year Book of the U.S.A. Department of Agriculture as follows:—“When the boundaries of the life zones and

areas are accurately mapped, the agriculturist need only ascertain the faunal area to which a particular crop or garden plant of limited range belongs in order to know beforehand just when it may be introduced with every prospect of success, soil and other modifying influences being suitable, and in the case of weeds and beneficial and injurious mammals, birds, and insects, he would know what kinds were to be looked for in his neighborhood, and could prepare in advance for noxious kinds that from time to time suddenly extend their range. . . . In short, a knowledge of the natural life areas and of their distinctive species and crops would enable fruitgrowers and farmers to select the products best adapted to their localities, would help them in their battle with harmful species, and would put an end to the present indiscriminate experimentation."

The Queensland Fruit Fly.

To return, it does not necessarily follow because many of the fruits upon which this *Tephritis* feeds are cultivated in all the colonies that the insect will also be able to flourish as a persistent pest in all such places. This has already been amply demonstrated in other countries, and it is quite reasonable to suppose that the same circumstances would apply to Australasia.

It was not until the New South Wales laws regulating the importation of fruit suddenly came into force that we heard much of the Queensland fruit fly in the neighborhood of Sydney, and now it is understood that one of the chief reasons for the stringent enforcement of the Act, especially as regards maggot-infested bananas, is "to protect the orchards south of Sydney from infestation." However, to my knowledge Tryon's *Tephritis* and another fruit fly have occurred in the vicinity of Sydney, though not as serious pests, for the past six years, and whilst I do not attempt to account for its not being so destructive there as it is further north, still there are others that do; in fact, one well-known and observant orchardist recently wrote:—"I have no fear that the Queensland fruit fly will become acclimatised in the county of Cumberland. It is a tropical production, and as our last two seasons have been tropical in place of semi-tropical they have been favorable to its invasion. I have it on good authority that the fly appeared here twenty years ago, and, given our usual season, I believe it will disappear again. So far as I can trace, it came down the coast, and not by vessel." Whether this observer is right or wrong time alone will show. It is interesting to note, however, that this view is supported by the example set us in the spread of *Ceratitis capitata* between Spain and Italy along the southern shores of France, which country it does not penetrate northwards to any extent. And further, as regards *Tephritis Tryoni*, we have undoubted evidence of its occurrence in Queensland for upwards of fifty years, and also the report of its occurrence in the Tweed and Richmond River districts for the past twenty years, to support the contention he puts forth. A knowledge of these circumstances leads us to the conclusion that we have here a subject well worth attention; and though we know that it is not "just now" that the more southern parts of New South Wales, South Australia, and Victoria are being threatened—for this importation of bananas has been going on for years unchecked—we must not come absolutely to the conclusion indicated by the gentleman whose words are quoted above, nor must we depreciate the excellent measures taken to prevent the further introduction of the pest.

The West Australian Fruit Fly.

That South Australia has little to fear of the introduction of *Ceratitis capitata* from West Australia direct I quite agree; but that the pest is just as likely to be introduced into the colony by the same means and from the same source as it has been into West Australia and, I understand, New South Wales, there is

but little doubt, unless, of course, the measures now in force for the protection of the orchardist from the threatened invasions are sufficient to meet this case also.

The distribution of this pest is now very extensive, and as it flourishes in many parts of the sub-tropical and perhaps tropical portions of the globe, there is little doubt that, whilst there is a possibility of the Queensland species not proving so troublesome in some fruit regions as in others, there is every chance that this other insect will thrive throughout the continent and parts of New Zealand, and perhaps even Tasmania. In the admirable paper quoted from above, the author remarks that—"The general trend of accidental importations seems to have been westward, and it is doubtless a fact that certain of our now cosmopolitan forms were originally Asiatic, and have travelled westward through Europe, to and across America, and thence to Hawaii, New Zealand, and Australia. The existence of such a law is borne out by the study of plants as well. . . . This general trend from east to west has always been in the direction of the newer civilisation—from the older civilisation to the newer. That this in itself is significant cannot be doubted, and in case of the insect and plant enemies of agriculture, the facts surrounding this condition are almost in themselves sufficient to account for this directive movement."

It is interesting to apply Dr. Howard's remarks to the spread of *Ceratitis capitata*. Though we cannot begin with a great degree of certainty, still if we take the East Indies for a starting point—and it was from there the species was first described—curiously enough we find it spread in those regions suitable to its propagation along the track of maritime commerce between the east of Asia and Europe. Thus we reach the Mediterranean, *via* Mauritius, the Cape of Good Hope, and Cape Verde Islands, proceeding thence across the Atlantic, through the Azores to the Bermudas. Here the westward trend of the species ends, for, so far as is at present known, it has not succeeded in crossing the thousand odd miles of ocean that separate those islands from a further westward and suitable habitat in Florida. As it is only within recent years that it has gained a footing in Australia at two points—the most eastward and the most westward seaports—one would naturally incline to the belief that the insect being of East Indian origin came thence to Australia. However, whilst it may extend into the tropical zone it may not be equatorial, and further, from what one knows of the trade connections between those islands and Australia, it does not appear a very easy matter for the pest to have originated from this source, particularly in Western Australia. The introduction of the insect since the adoption of the cold storage for fruit between Europe and Australia persuades one to accept the opinion that it was brought from there in some of the very large consignments of citrus fruits, which are carried to us very quickly and often at a low temperature. We may with good reason infer that any insects with which such fruit might be infested would reach port under the most suitable conditions for their propagation, and fruits infested with the maggots of this fly would be partially decayed and therefore early discarded. This being the case one might be readily excused for asking, why has the pest not reached our orchards long ago? Speaking of such importations, however, Dr. Howard says:—"The water frontage of a seaport city is not a favorable place for the establishment of a species which feeds on living vegetation. Frequently, even when it is a species well fitted for acclimatisation, it will have to fly or be carried for miles inland before it can find a place possible for the establishment of the species. So it happens that while foreign insects are frequently found about the wharfs of our larger seaports during the summer months, almost none have succeeded in getting a foothold in the vicinity." So if the neighborhood of Sydney should after all prove a suitable habitat for the Queensland species referred to before, then we have a good instance of Dr.

Howard's contention, for even yet the orchards there are not regarded as suffering severely from that fly, and the more inland and southern orchards are still said to be free, despite the continual introduction of the pest into Sydney, where often tons of discarded bananas were wont to lie upon the wharfs long after the fruit had been discharged from the vessel, not to mention that which found its way into the many fruit stalls of the city and suburbs.

ORCHARD NOTES FOR OCTOBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

If it has not been already done, the ploughed surface of the orchard should be cultivated down to a finely pulverised condition at once to retain the moisture.

Newly planted trees, or any others that are misshapen, should be carefully examined, and unnecessary or misplaced shoots rubbed out or pinched back to shape the tree or form fruit spurs out of rampant shoots.

The planting out of citrus trees can be safely performed yet, but if they have to be carried long distances a ball of unbroken soil should be retained around the roots. Always thoroughly water these trees when set out, and should the soil be dislodged from the roots cut the tops back if large, or if much tender sappy growth is present on the points pinch them out.

Buds, if procurable, may be inserted into citrus trees now the sap is active.

Passion fruit vines could be put out now. This fruit should be cultivated more than it is upon the Adelaide plains.

Towards the end of the month, when the natural "drop" has passed, the fruits may be thinned off if too abundant upon apricot trees.

The larvæ of codlin moth that have hybernated during the winter will begin to emerge as moths, and deposit eggs upon the young fruits of apples and pears. If the old loose sheltering bark and bandages had been removed and burnt, as so often suggested in these notes, during the winter the numbers of moths would have been largely reduced. The young larvæ should be combated now by spraying with either Paris green or arsenite of soda as soon as the blooms are fallen from the flowers, and while the calyx ends are yet unclosed. One ounce of Paris green and $\frac{3}{4}$ lb. fresh lime in 10 galls. of water, or 1 lb. arsenic 2 lbs. washing soda dissolved in 1 gall. of boiling water, and used at the rate of 1 pint to 40 galls. of water in which 4 lbs. of fresh lime has been slaked both proved good preventives last year in my tests at Marion. As the month closes bandages should again be placed upon the trunks, and regular weekly examinations be made of them to secure the early caterpillars as they leave the fruits.

The peach trees should be closely watched for any outbreaks of peach aphides, and any such should be promptly suppressed, either by spraying with tobacco water or by enclosing the trees in a calico sheet and fumigating them with tobacco waste.

Aphides on the oranges should also be treated similarly when much injury is anticipated.

MONGRELS.—It has been proved over and again, during more than a hundred years, that the first cross between two distinctly pure breeds of poultry, horses, cattle, sheep, pigs, or other domesticated animals results frequently in the production of progeny distinctly superior to either parent; but the breeding of crossbreds with crossbreds results in mongrels which are quite inferior to parents and grandparents. Moral, stick to pure breeds and first crosses only.

NOTES ON VEGETABLE-GROWING FOR OCTOBER.

BY GEORGE QUINN.

Make sowings of cucumbers, marrows, trombones, watermelons, sweetmelons, in fact, all the useful *enurbitaceæ*.

These do well when planted in soils rich in humus either made by decayed vegetable matter direct, or stable manure.

Dwarf and runner beans should be sown in drills, and covered with manure.

All seeds sown now should be covered with a mulch of finely-pulverised manure, which not only retains moisture, but remains loose and permits the tender germinating growths to penetrate through to the surface uninjured. The surface of the soil between all growing crops should be frequently stirred—not turned over—to retain moisture.

Peas should be staked against rough winds. In shady positions small sowings made of lettuces, cresses, radishes, &c., to keep up a constant supply of salad plants.

Shelter should be afforded for earlier-planted melons and tomato plants. Boughs of trees are very useful if obtainable.

If cabbage or cauliflower plants are retained for seeds care should be taken to destroy useless specimens growing near by, which might possibly contaminate the strain. A close muslin bag is a good protection during the blooming period, as it keeps off most insects, but it must not be permitted to rest upon the flowers of the confined plant.

Herbs should be cut now, and hung in bags for future use.

If the month turns dry growing vegetables may require irrigating, as to be of good quality they must not receive a decided check in their growth at any time.

THE VINEYARD.

NOTES AND HINTS FOR OCTOBER.

Written for the "Journal of Agriculture and Industry."

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The Soil.—Scarifiers should be kept going to break up the crust formed on the surface and to destroy weeds. One scarifying is never sufficient; its effects should *always* be completed by a cross working, given as soon as possible after the first. This practice ensures a more complete destruction of the weeds and more perfect cultivation of the soil.

Disbudding.—Vines should be disbudded before the useless shoots attain too great a development; usually all shoots growing from the stems or the roots can be suppressed with advantage, especially on trellised vines. October is the most suitable month for disbudding. During the course of this month grafts should be very carefully freed of the vigorous suckers that always tend to threaten the existence of the scions. Roots growing from the scions should at the same time be removed.

Sulphuring.—During the course of this month, and more particularly in wet districts, all vines should receive a first sulphuring. The sulphur should be evenly distributed all over the green parts of the plants by means of a specially-constructed bellows. Choose preferably a calm warm day for the purpose. Should the temperature continue low the sulphur remains inactive. Wet or threatening weather must always be avoided.

Night Grubs or Cut Worms.—These grubs, or rather caterpillars, promise to be exceptionally annoying this season, I am afraid. They are very destructive on young vines, whether planted in a nursery bed or in the open vineyard. Place around each vine about a tablespoonful of the following mixture:—Paris green, 1b.; bran, 30lbs.; treacle, 5lbs.; water, 2galls. Dissolve the treacle in hot water and then add the Paris green, stirring thoroughly: then mix well with bran. The mixture should not be too wet, or else it forms a sort of crust, which dries up and remains untouched by the grubs. Avoid placing the mixture too close to the stem, or else there is some danger of seeing the plants injured. The grubs are rather fond of the sweet mixture, eat their fill, and die.

Late Frosts.—We are tending to leave late frosts behind us, and to enter upon the season of north winds. Nevertheless it is necessary to remember that it is only in 1891 that we were visited by an extremely acute frost towards the end of October, and that in consequence it is necessary that we should still be on our guard against such an occurrence. We should be prepared to produce, when required, a quantity of smoke sufficient to protect our vineyards whilst the frost lasts.

WEATHER AND CROP REPORTS.

AMYTON.—The past month has been warm, with dry northerly wind and no rain. The crops have suffered severely, and unless we get a good rain soon many paddocks will not be worth reaping, and all will be very light.

ANGAR PLAINS.—Rainfall for August, 1.19in.; September, 0.35. Rain is badly needed, as the heavy winds have affected the crops. Cape oats and early wheat coming into ear. Shearing commenced. Stock looking well.

ANGASTON.—Splendid season so far. Wool clip expected to be heavy. Orchards and vineyards looking well. Spraying general throughout the district.

BALAKLAVA.—Since previous report we have had nice steady soaking rain, about 2.50in., which has been followed by warm growing weather. There are a few complaints of takeall.

CALCA.—The weather during month has been warm and dry and more rain is badly needed. Crops look healthy but backward, and unless a good fall of rain occurs soon the harvest will be light. Shearing is in full swing, the clip being very good and clean. Lambing has been good, but eagle hawks have caused considerable loss. Stock in good condition, and fat stock high in price.

INKERMAN.—Beautiful soaking rains have fallen since previous report, causing much improvement in crops and feed. Haymaking will commence before end of September, and yield should be good. The heads in many wheat crops are exceptionally large, and with favorable weather now a heavy return is expected. Feed abundant; stock in good condition. Rainfall for month over 3in.

JOHNSBURG.—We have had some rather drying winds, which have checked the crops. The fields look healthy, but a good downpour would allay the anxiety which is felt at this critical time. Feed is plentiful and stock in splendid condition.

KAPUNDA.—Crops look very promising still. Feed is plentiful and stock fat.

MILLICENT.—With the exception of a few boisterous days the month has been very favorable, and crops of all kinds are coming on splendidly, giving promise of an exceptional season. Feed is better than we have had for years, no frosts of any account having been experienced. There is a great demand for seed potatoes, with a short supply.

MOUNT BRYAN EAST.—Crops are looking healthy. If we get rain this month a fair average crop will be reaped. The rainfall for September is small. Subsoil is still quite wet.

MOUNT PLEASANT.—Rainfall for August, 2.35. Stock improving, feed very good, but crops, especially the late sown, show the effects of too much wet.

MURRAY BRIDGE.—The weather has been somewhat dry, but crops continue to look strong and fresh on soil of a good depth and well worked. Early crops are in ear, and over the fences; late sown somewhat backward. Feed is abundant, stock in good condition, stores very scarce. Shearing has commenced, the clip promises to be fairly good.

MYLOR.—The weather has been favorable for planting, and all have been busy putting in potatoes and onions. Crops are looking well.

NANTAWARRA.—Crops look well, but wild mustard is prevalent in many paddocks. Since last rain drilled crops are improving faster than the unmanured. Stock in splendid condition, and feed is plentiful. Farmers busy working the fallows, the late rains having caused the rubbish to grow, and it will be possible to clean the land better than for several years past.

ONETREE HILL—Rainfall light and weather very trying. Crops look well, but an inch of rain would do much good. Grass abundant and stock fat.

PASKEVILLE.—The weather has been favorable, but half an inch of rain would be very beneficial. The crops on the whole look very well, especially those that were drilled.

PINE FOREST.—The weather is setting in very warm and dry, and heavy winds have knocked the forward crops about a little; some are up to the tops o' the fences, and all are in ear and looking well. Shearing has started, and the clip promises to be good. Feed plentiful and stock in good condition.

PTAP.—Crops look well, and haymaking will commence very soon. Strong winds with but little rain experienced during month.

REDHILL.—Rainfall since previous report about 2½ in. Crops growing fast, the early ones being in flower. Black rust is showing in many paddocks. Grass abundant; stock in good condition. Shearing is general and following nearly finished.

SADDLEWORTH.—Little rain since previous report; more would now be very welcome. Stock in splendid condition; grass better than for some years. Crop prospects very good; apricots fruiting well. Following on account of a wet July is still unfinished. The wool clip will be much sounder this season. Rainfall September, to 26th, 1·36 in.

STANSBURY.—The season is very favorable and the crops give promise of good returns. More rain would be beneficial.

STOCKPORT.—Crops are looking well; feed is plentiful; stock in good condition.

STRATHALBYN.—The month has been exceedingly dry, rainfall only about ½ in. We have had very high winds, and on the 21st we had hot winds, which have done very serious damage to the crops and have dried off the grass. Unless we soon get some rain the crops will be very short and the yield small. Stock is in good condition.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

September 30th, 1898.

Rather a dry month experienced, the rainfall being below average for September, but as the agricultural districts, except in a few patches, had a good subsoil soaking during the winter, crops in most places are coming along fairly well; but would be considerably benefited by a good rain within the next week or two, which would go a long way to ensure at least a fair harvest in most directions, though in several extensive districts unless moisture comes soon the fields can produce but a very meagre return. A fine season is being experienced in most of the outside pastoral country, and it is to be hoped that the generous legislation in the new Pastoral Amendment Bill will lead to extensive reoccupation of the runs that were abandoned during the recent severe drought, especially at this juncture when the vermin pest has been so much reduced by this cause.

Business is very fair, both town and country, excepting in those districts that have missed the rains.

During the month the breadstuffs market has been quite in a state of collapse, and although wheat is 6d. to 7d. per bushel easier than when we last reported, price must come lower, our market being still nominally 4d. to 5d. above Melbourne rates, and sellers in that colony, on our borders, offering freely in this direction. Millers, however, are not operating, influenced doubtless by the reports of the record harvest that is being reaped in the northern hemisphere and the fact that an Australasian surplus—not heavy—is still available, whilst freights are high, and difficulties in obtaining shipment for the coming crop apparently feared. In the earlier districts haymaking is in full swing and a fair yield being cut. Millers' offal lines are nominally unchanged, but the tone of market is weaker. Forage is decidedly easier, in sympathy with lower intercolonial rates and the abundance of growing feed.

Stocks of potatoes are exhausted, the market now being supplied by new locals and a few old season's imported. The price being dear, whilst breadstuffs are declining, demand for the favorite tuber is much restricted. Onions also continue scarce and maintain extreme rates. Both these lines must remain high for several weeks, although the new crops are coming along nicely.

Quantities of butter have steadily increased, but we must now reckon that we are in the flush of spring supplies, although some of the large factories will later on supplement their output when they ease down cheese-making. Price has very well maintained, and is not likely to come lower, as latest London cable advices report a substantial improvement there. The last two mail steamers from our shores have taken away 404 and 600 boxes respectively, and it is probable that October shipments will show steady increase. An excited market has been experienced in eggs. Values early in the month dropped fully 1d. lower than was expected, but did not remain at the low price as a smart reaction occurred. Bakers have been busy putting down both eggs and butter for future requirements, whilst the export demand for the first named has been far in excess of the ability of our colony to supply. Cheese is coming forward in increasing quantities; price has therefore eased and may be

expected to further decline. Bacon, under the influence of slightly better supplies of pork, is somewhat more plentiful, and quoted 4d. lower. Hams are scarce, and must advance in price with the approach of summer trade. Honey has ruled very quiet, but stocks of old season's being light, no great quantities are offering. The new take is, however, beginning to come on the market and opening at low prices. Beeswax scarce. Almonds have steady sale without quotable alteration.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, dull at 3s. per bushel of 60lbs.
 Flour.—City brands, to £9 10s.; country, quoted £9 per ton of 2,000lbs.
 Bran.—8d.; pollard, 9d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 10d.; stout white, 2s. 6d. to 2s. 9d.; imported, nominal, 3s. 4d. to 3s. 6d. per bushel of 40lbs.
 Barley.—Malting, 5s. to 5s. 6d.; feeding sorts, 1s. 10d. to 2s. 2d. per bushel of 50lbs.
 Malt.—Local, 9s. to 9s. 6d. per bushel of 40lbs.
 Chaff.—£2 10s. to £2 15s. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—New local, £12 to £13; imported, old, £10 to £12 per 2,240lbs.
 Onions.—£19 to £21 per 2,240lbs.
 Butter.—Creamery and factory prints, 8½d. to 9½d.; dairy and collectors' lines, 6½d. to 7½d. per pound; bulk factory, 9d. to 9½d., chilled, f.o.b.
 Cheese.—S.A. Factory, large to loaf, 8d. to 9d. per pound; matured imported, 9½d. to 9¾d.
 Bacon.—Factory-cured sides, 8d. to 8½d.; farm lots, 7½d. to 7¾d. per pound.
 Hams.—S.A. factory, 7½d. to 10d. per pound
 Eggs.—Loose, 8½d.; in casks, f.o.b., 9d. per dozen.
 Lard.—In bladders, 6d.; tins, 5d. per pound
 Honey.—2½d. to 2¾d. for best extracted, in 60lb. tins; beeswax, 1s. 1d. per pound.
 Almonds.—Soft shells, 3½d.; kernels, 8½d. to 9d. per pound.
 Gum.—Best clear wattle, 2½d. per pound.
 Live poultry.—Prime roosters, s. to 2s. 6d. each; good hens, 1s. 6d. to 1s. 11d., ducks, 2s. 3d. to 2s. 6d., geese, 3s. to 3s. 6d.; turkeys, 5d. to 7½d. per pound live weight for medium to prime table birds.

LOCUST POISONING.—At Natal, Cape Colony, a most successful method of destroying locusts in their hopping stage has been adopted. The method is published by the Government, and is as follows:—In four gallons of boiling water dissolve 1lb. caustic soda (common washing soda), then stir in 1lb. arsenic, and be careful not to breathe in the fumes. Let the solution cool, and when about to use it, add four gallons more water and dissolve in this 10lbs. brown sugar. A still better preparation can be made by adding half a gallon of the first (strong) solution to five gallons of treacle. Maze stalks, grass, &c., are dipped into this mixture and scattered wherever the hoppers are congregated. They eat the poisoned food and die, and the hoppers eat their dead companions and also die. The poison can also be splashed with a whitewash brush upon everything for which the locusts have a liking. The odour of the treacle or sugar will attract the hoppers for a distance of one hundred yards. When it is remembered that the locusts do their greatest mischief whilst in the hopping, or wingless stage, the importance of destroying them at that period is at once apparent.

"WHITE ANTS."—These insects are not ants, and they do not eat living wood. The heart-wood of living trees is not "live wood," and has ceased to grow. This wood is very often attacked by termites; but only when they can get at it without having to eat through living wood to get at it. The "cambium," or "white" outer growth on roots or stems of trees must have been broken through somehow before the termites attacked any growing tree. When digging trees out of a nursery bed it is a common practice to cut the roots, and when such trees or vines are planted in "white ant" infested land, the insects are very likely to attack the wounded roots, and work their way into the heart-wood of the stems or trunks. In such land it would be better to raise trees on the spot from stones or pits and from pips, and then graft or bud the stocks without digging them up.

CENTRAL AGRICULTURAL BUREAU.

MONDAY, SEPTEMBER 19.

Present—Messrs. F. E. H. W. Krichauff (Chairman), S. Goode, W. C. Grashy, M. Holtze, T. B. Robson, C. J. Valentine, and A. Molineux (Secretary).

Soursops.

Mr. ROBSON said he wished to correct report in previous issue *re* gas lime not destroying soursops. Where he applied the lime the weeds were destroyed, but it was not done thoroughly, and some bulbs escaped destruction and soon spread again.

Agricultural College.

Mr. ROBSON said he noticed in the prospectus of the Agricultural College that in connection with the examination for the college diploma 300 marks were allowed for viticultural subjects, and only 200 for general farming, which included dairying. Half the marks in the first-mentioned subjects were for the science and practice of wine-making, and he thought it a mistake for this subject to be compulsory, as farmers could not be expected to go in for wine-making.

Other members agreed with Mr. Robson's remarks, but thought the matter one for the council of the Agricultural College to consider and not the Bureau.

Spraying Calendar.

Mr. HOLTZE called attention to the handy calendar of operations for treatment of insect and fungus pests issued by the New South Wales Agricultural Department, and thought the Bureau might draw up one for South Australia, and have them posted up in post offices and institutes.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

235. *Results of Feeding Cows with Linseed Oil.*—With four cows in the middle of their period of lactation the experiment was made at Poppelsdorf during thirty-two days. During the first and last eight days the cows received 10lbs. of mangolds, 28lbs. of hay, 6lbs. of straw, 8lbs. of malt germs, 4lbs. of barley meal, 8lbs. of linseed flour from which the oil was pressed. From the 9th to the 16th day each cow received 1lb. of linseed oil in addition, mixed every morning and evening with the water by means of a hand centrifuge. The cows now lost appetite, left much of their ration, and did not seem to be well. From the 17th to the 24th day no more oil was given, but for the 8lbs. of linseed flour 8lbs. of crushed linseed were substituted. This they readily consumed, and also their full rations. (I may here mention that flax seed contains 33½ per cent. of fats, linseed cake 10 per cent., but only 0.91 per cent. is in either case digestible.) From the 9th to the 16th day considerably less milk was given, which subsequently increased in the last sixteen days. From three of the cows the fat in the milk increased in the smaller quantity of milk by 0.23 per cent. from the feeding with oil, which was lost again in the next eight days, and in the last eight days, from the 25th to the 32nd, the cows gave the same quantity of the same quality as in the first week. Neither the oil nor the crushed linseed were therefore of advantage, and the former interfered much with the digestion and general health.

236. *Cows Grow Familiar With Their Surroundings* and to other cows, whom they frequently lick. If they are removed their supply of milk generally decreases at least for some considerable time. Professor Haecker mentions specially that the well-known cow, "Dora," gave only 140lbs. of butter in the first year after being sold, and only subsequently the yield of butter from her increased to 400lbs. and 450lbs. a year. Two other cows pined so much after being separated that the quantity of milk from the decreased very much.

237. *How to Salt and Smell the Meat* is an article in the American *Acker and Garten Zeitung*. The *modus operandi* therein advised is the following:—After cutting up the hog throw the pieces into a cask with cold water for three or four hours, change the water once or twice until it is no more colored by blood; then hang to dry in a drying room for five or six hours.

Meanwhile mix well together 10 parts of salt, $\frac{1}{2}$ part of sugar, $\frac{1}{2}$ part of roughly ground coriander seeds and one-tenth part of purified pulverised saltpetre. Rub this well into the meat and prepare a brine in the proportion of seventeen quarts of water, six quarts of salt, and a quarter pint of the pulverised saltpetre. This brine is boiled for about half an hour, while it is constantly stirred to prevent the burning of the saltpetre. Place the meat with the skin downwards until the cask is full, pour the cold brine on to it until filled up to two-thirds of its height, and place a weight of 150lbs. to 200lbs. on the cover to press the meat down into the cask. After two or three days you may observe a yellow seum over the cover, which must be removed. After sixteen to twenty days take the meat out, place it in another cask, this time with the skin upwards, and pour the pickle on it again. Smaller hams, bacon, and tongues do not require to remain more than ten to fourteen days in the pickle. Hams will look a vermillion color, even the bones, and they are very juicy. The coriander prevents any fermentation. The smoking of hams, &c., deprives them of part of the water; certain constituents of the smoke (emphyreumatical oils and creosote) enter and increase the durability, but the smoke must be continuous and dry, not watery. The wood must therefore be quite dry, and it is better not to use any from pines or firs, which give a bad taste. The heat of the smoke should not exceed 54° F., or part of the fat will exude and get a yellow color. Sausages made from liver require from one to two days, other sausages about eight days, bacon fourteen days, hams frequently three to four weeks.

Another shorter way of curing is to rub a mixture of thirty-two parts of salt and one part of saltpetre into the yet warm meat, to sprinkle as much bran over it as will cling, wrap it into a newspaper and smoke it as before. To keep hams in the warm months it is best to pack them into a box placed in a dry place and containing dry and sifted wood ashes. Butchers frequently use a quick way of smoking. They take fifty parts of raw wood vinegar, 100 parts of water, and two and a half parts of juniper oil, into which they dip the meat for some seconds and hang it up to dry in a room hot enough to make the fat soft. After the drying they dip again three or four times and always leave the meat to dry three days. They can also use a paint brush instead of dipping.

238. *Rusts, and Fungus confounded with them.* Dr Franke's paper read in Berlin, and latest investigations by others, are interesting. Professor Dr. Franke said the leaf rust (*Puccinia graminis*), the striped rust (*Puccinia straminea*), and the oat rust (*Puccinia coronata*), are similar in appearance. They begin with the spores in summer (*Uredo*), the winter spores follow (*Puccinia*), and lastly is the *Aecidium* form, a produce of these latter, which, however, only appears on another plant, not on cereals. Such host-plants are for the *P. graminis*, the Barberry (*Berberis communis*), and appearing thereon it is called *Aecidium berberidis*, for *P. straminea*, *Anchusa officinalis*, and other herbaceous plants, and for *P. coronata* the buckthorn (*Rhamnus alaternus*), and the blackberry-bearing alder (*Alnus glutinosa*). But Mr. Erickson distinguishes five or six species of rust, and is of opinion that the host-plants are not absolutely required. Erickson believes that the rust may appear through a morbid matter within the plant, for in the protoplasm of cereal cells such has been found by him. This can become a thread of the mycelium of rust, and thus actually spring from the blood of the cereal. Professor Franke mentioned a number of parasites which are frequently confounded with rust, and thinks that a top dressing with nitrate of soda favours the growth of rust, while manuring with phosphoric acid is now known as checking the appearance of rust. Five hundred and fifty sorts of wheat were sown close together in Silésia, when the several American and Indian sorts were almost entirely destroyed, while many newly-bred sorts of wheat were almost free. The Ebbweizen was quite free; Squarehead in five cases attacked, in twelve others not.

239. *Manuring of Tomatoes.*—Mr. W. Neild, F.K.H.S., read a paper on the experiments made at the Cheshire Agricultural and Horticultural School. In 1896 neither farmyard nor artificial manure was applied until the roots had taken possession of the soil into which they were planted, and thereafter each plant received $\frac{1}{2}$ oz. fortnightly put on the surface and watered in. Where more than one kind of manure was used they were mixed in equal proportions. The following were tried, viz.:—

- No. 1. Nitrate of soda and muriate of potash.
- No. 2. Superphosphate of lime, muriate of potash, sulphate of iron.
- No. 3. Sulphate of ammonia and muriate of potash.
- No. 4. Muriate of potash, sulphate of iron, and nitrate of soda.
- No. 5. Sulphate of iron and muriate of potash.
- No. 6. Muriate of potash.
- No. 7. Sulphate of iron.
- No. 8. Nitrate of soda.
- No. 9. Sulphate of ammonia.
- No. 10. Superphosphate of lime.

Nos. 2, 5, 6, 7, and 10 were quite a failure, indicating a deficiency of nitrogen. Nos. 3 and 4 were fairly healthy, and produced a moderate crop. Nos. 1, 8, and 9 were healthy, produced a full crop similar to plants supplied, with diluted liquid manure from stables and

shippens, which in the end gave the best results. Sulphate of ammonia alone produced better results than when combined with muriate of potash, which latter by itself proved a failure. In 1897 the application of manure was the same: only the $\frac{1}{2}$ oz. was given weekly after the first two. The following trials were made, viz.:—

- No. 1. Kainit.
- No. 2. Nitrate of potash.
- No. 3. Kainit and nitrate of soda.
- No. 4. Nitrate of potash and nitrate of soda.
- No. 5. Kainit, nitrate of soda, and sulphate of iron.
- No. 6. Nitrate of potash, nitrate of soda, and sulphate of iron.
- No. 7. Nitrate of potash, nitrate of soda, and superphosphate of lime.
- No. 8. Kainit, nitrate of soda, sulphate of iron, and superphosphate of lime.
- No. 9. Two parts kainit to one part nitrate of soda.
- No. 10. Two parts nitrate of potash to one part nitrate of soda.
- No. 11. Two parts nitrate of soda to one part kainit.
- No. 12. Two parts of nitrate of soda to one part nitrate of potash.
- No. 13. One part each nitrate of potash and superphosphate of lime.
- No. 14. Kainit, superphosphate of lime, and nitrate of soda—equal
- No. 15. Nitrate of potash and sulphate of ammonia.
- No. 16. Muriate of potash.

Of the manures of 3, 4, 5, 6, 7, and 8 equal parts were also taken. Where no manure was used and 1, 2, and 16 were a failure and the flower failed to set, which leads to the belief that the potassic manures are of little use for tomatoes. When a light dressing with nitrate of soda was given a marked improvement was observable in three or four days. Decidedly the best results were obtained from 12 and 13 and from liquid manure, although Nos. 11, 14, and 15 were good and the others produced fair results. In America 7 per cent. of phosphoric acid, 19 per cent. of potash, and 25 lbs. of nitrate of soda in top dressings were recommended—the potash for color and quality. Tomatoes grafted on stems of potatoes produced a good crop of fruit, but not equal in quality or size.

240. *Value of Soot.*—A. Mayer states that where mixed materials had been used for burning you may find 5 per cent. of nitrogen, in which $2\frac{1}{2}$ per cent. of ammonia is contained. Where turf had been burned he found 1 per cent. of nitrogen, of which 4.6 per cent. was ammonia. The rest of nitrogen, he thinks, are Peridier bases, chiefly containing poisonous substances, which prevent injurious insects from attacking plants. Dr. Cameron gives an instance of the value of soot on wheat, which when dressed with it gave 10bush. more than where not dressed with it, and oats 6bush. more. An application of 56bush. of soot, mixed with 6bush. of common salt, produced larger yields of carrots than 24 tons of farmyard manure with 24bush. of bones.

Jiggers.

The Secretary referred to the pest known in South Africa as jiggers. It is a small flea (*Pulex penetrans*), which penetrates beneath the toenails, causing ulcers, and if not attended to the flesh decays, until the patient is crippled and unable to walk. In the *Natal Agricultural Journal* a writer refers to the horrible effects of this pest, and to the fact that it was gradually extending from Central to South Africa. The Secretary said he thought we should be on our guard against introducing this insect, as it attacked domestic animals as well as man, and would if it was introduced thrive in our climate.

Conference at Mylor.

The Hon. Secretary Mylor Branch wrote that the Second Conference of Hills Branches would be held at Mylor on Tuesday, October 25.

Codlin Moth.

Mr. GRASBY said he thought the Bureau should take some action to bring under the notice of fruitgrowers the necessity for taking early action to remove old bandages, rough bark, &c., from apple and pear trees. He knew that in many gardens they were left on right through the winter, the growers being ignorant of the fact that they were simply providing safe shelter for their enemies. It was no use waiting until the fruit was attacked and then trying to compel the growers to carry out the regulations. They must be educated beforehand to the necessity for the work.

The SECRETARY said he doubted whether a single grower of any standing had failed to receive instructions either in print or verbally on this matter, but the trouble was many simply would not take the trouble to do the work. Every notice sent out by the department advised the grower that he was legally bound to remove the bandages before July 31.

After some discussion the following resolution, moved by Mr. Grasby, was carried:—"That the attention of the Minister of Agriculture be respectfully directed to the need for giving information to fruitgrowers as to the necessity for immediate preventive action in respect to the codlin moth."

New Branches.

The CHAIRMAN reported that the residents of Meningie were desirous of forming a Branch of the Bureau in that locality. They had written to him for information on the matter.

Mr. H. BROWN, of Mannum, wrote that the residents desired to re-organise the Branch, which had been defunct for several years. The following gentlemen were willing to act as members should the Central Bureau approve of the request, viz.:—Messrs. J. G. Preiss, O. A. F. Faehrmann, R. L. Herbert, C. G. Pfeiffer, J. A. Schulze, J. E. Schutze, Dr. E. Minchin, E. Hauesler, S. Hauesler, B. Baseby, J. S. Nickels, J. Hooper, G. Lenger, Henry Brown, and J. W. Walker. Request approved.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Carrieton, Mr. F. Vater; Port Broughton, Mr. A. H. Dolling; Brinkworth, Mr. H. Bastian; Orroroo, Mr. H. Roberts; Woolundunga, Mr. N. J. S. Rogers; Cradock, Messrs. B. Garnett and J. H. Iredell; Hartley, Mr. J. Jaensch; Willunga, Messrs. J. Kernick, G. R. Ewens, and Joseph Valentine; Port Elliot, Mr. J. McLeod; Kapunda, Mr. W. M. Shannon; Maitland, Mr. S. B. Moody; Artherton, Mr. C. L. Palm; Caltowie, Messrs. A. Kerr, M. Hill, and A. McCallum; Renmark, Mr. Bostock; Riverton, Mr. W. Hannaford; Balaklava, Messrs. W. Smith and A. W. Robinson.

Reports by Branches.

The Secretary reported receipt, since previous meeting, of eighty-six reports of Branch meetings.

REPORTS BY BRANCHES.

Stockport, August 27.

Present—Messrs. T. McGaw (Chairman), D. G. Stribling, C. W. Smith, F. Watts, S. Rodgers, J. Smith, G. Burdon, C. F. Jorgensen, and J. Murray (Hon. Sec.).

AGRICULTURAL SHOWS—Mr. J. Smith thought some arrangement should be made to allow visitors at shows to taste the exhibits of butter and cheese, so that they might learn where one fails and another succeeds, and that the successful competitors should supply information as to making. This would also apply to crops, such as cereals, vegetables, &c. The manures used, and how used, should be given. This would make the show an education to the visitors. Members thought it would be a good plan for the Show Committee to print items of information in this direction supplied by the prize-takers. With stock the pedigrees, mode of feeding, &c., should be given with all exhibits. It was decided to suggest that the Central Bureau take this matter up. [At some large agricultural shows in England the prize cheese, butter, bacon, &c., is

made up into small packages and sold to visitors who wish to "taste and try." At many shows in Australia a few of the visitors steal small samples of dairy produce, fruit, &c.—GEN. SEC.]

UNPROFITABLE FARMING.—Mr. J. Smith read a paper on this subject, telling the members in a humorous way the methods they should adopt to make farming unprofitable, the whole being summed up in the word "Neglect"

Mundoora, August 26.

Present—Messrs. J. Blake (Chairman), R. Harris, W. Aitchison, J. J. Vanstone, N. J. Francis, W. D. Tonkin, A. McDonald, W. Atkinson, D. Smith, T. Watt, and A. E. Gardiner (Hon. Sec.).

SOURSOPS.—Mr. Harris said there was a small patch of this weed in one of his paddocks near where an old flower garden had been, and he was of opinion that it had been introduced as a garden plant. He had managed to keep the patch from increasing in size by frequently digging it over, and carefully removing all the bulbs he could find. He intended also to cover the patch well with straw and burn it. Mr. Vanstone said he also had a patch of this weed in an old garden. By the means adopted by Mr. Harris the weed could be got rid of.

FERTILISERS.—Members report that the crops put in with the seed and fertiliser drill were already showing to great advantage over the unmanured.

EXPERIMENTS.—Two members report that Carleton pea received from Central Bureau appeared to be too slow a grower for this district.

Dowlingville, August 26.

Present—Messrs. R. A. Montgomery (Chairman), T. Illman, J. Phelps, W. T. Holland, R. Willing, T. Kenny, G. Mason, F. Roberts, J. L. Broadbent (Hon. Sec.), and one visitor.

SOURSOPS.—Members reported that this weed did not exist to any extent in this district. [Members should make an effort to have it destroyed while they have a chance of doing it at little trouble. If allowed to spread it will be a source of endless trouble and expense.—GEN. SEC.]

DISCUSSION.—Some discussion took place on paper read at previous meeting on machinery, also on home made commercial fertilisers.

Gawler River, August 26.

Present—Messrs. T. P. Parker (in chair), A. Bray, R. Badcock, J. Hillier, D. Humphries, J. S. McLean, F. Roediger, J. Bushbridge, H. Roediger (Hon. Sec.), and three visitors.

SOURSOPS—Several members reported that this weed was introduced into the district forty-five years or more ago, they believed as a flower. It had since spread very much, and the only satisfactory way of keeping it in check is to continually work the land to prevent the plants from flowering or developing their leaves properly. Where this is done good crops can be grown, but it is important that the wheat should get a good start of the weed. The soursops should be scarified up and then the wheat sown at once. The Hon. Secretary said he had been told by several that they had got rid of small patches of this weed by covering them up with old bags and straw or manure, and so suffocating them. Mr. F. Roediger said he had destroyed it by a good dressing of salt, but this rendered the land useless for two or three years.

CURING HAMS.—Mr. McLean said when curing hams he cut off the knuckle joint, cleaned out the marrow from the bone, filling up with saltpetre and salt. He had none go bad since adopting this plan.

SUMMER FODDERS.—The Hon. Secretary said he sowed Kaffir corn last season, and though very little came up it lived through the drought, and with the first rain grew very quickly. It stood better than anything else he sowed, and, being more leafy and juicy than amber cane, was worth trying again. He had grown the Jersey tree kale and found it most useful from March to May, when other feed is scarce. About a fortnight after the first rains it produces a large quantity of feed, and if planted on well prepared and manured ground is a splendid drought resister. To have a continuance of feed during summer he would advise sowing maize, amber cane, or Kaffir corn, Jersey tree kale, and pie melons. These would be ready for feeding in the order named. Where the land can be irrigated lucern should be sown. Mr. McLean said he found the stalks of maize and amber cane chaffed made good feed for stock.

Port Elliot, August 27.

Present—Messrs. C. H. Hussey (Chairman), E. Wood, H. Green, J. Brown, P. O. Hutchinson, W. E. Hargreaves, J. O. Whitmore, F. T. Fischer, J. Davidson, E. Hill (Hon. Sec.), and one visitor.

SOURCES.—Discussion on this subject took place. Members stated the weed was generally distributed in small patches, chiefly in gardens, throughout the district. It was introduced first as a garden flower, and is found in the soil round fruit trees sent to the district. No concerted action had been taken to get rid of it, and the members appeared to be of opinion that it had come to stay.

"JOURNAL OF AGRICULTURE."—The Chairman called attention to various matters of interest appearing in the August issue of the *Journal of Agriculture and Industry*.

PEACH APHIS.—Mr. Fischer reported having dug slack lime in around the roots of some of his peach trees. These trees were free from aphis, while the other trees in the same row were badly infested. Mr. Hargreaves stated that he had satisfactory results from washing the trunks of the trees with decoction of the tree-tobacco leaves.

Elbow Hill (Franklin Harbor). August 27.

Present—Messrs. E. Wake (Chairman), H. Dunn, J. Harvey, D. McKenzie, C. G. Ward, W. Ward, and G. Wheeler (Hon. Sec.).

MANURING.—Mr. McKenzie reported that in his manured crop he had left one land unmanured, and the difference was astonishing. So far he had every reason to be satisfied with his experiment.

HORSE-BREEDING.—A short discussion took place on the best time for mares to foal in this district. Some members favored early foals, while others thought there would then be too much danger of the mare slipping the foal when worked at seeding time. Mr. McKenzie thought it better to buy than to breed, on this account. The Chairman thought foals could be bred from working mares that are well fed. Mr. Elleway considered it would pay to keep a mare or two for breeding alone, and not for work. Mr. Wake, in a short paper on "The Best Horse for Farm Purposes," advocated breeding from Clydesdale mares mated with a Suffolk Punch sire. The progeny will be a good, strong, shapely horse, with plenty of action.

PAPER.—Mr. H. T. Styles read a paper upon "What I Gain by being a Member of the Agricultural Bureau," in which he tried to show that, whilst it might be to the interest of machinists, inventors, and others to protect their work by patents and restrictions, the cultivator of the soil can be more liberal and communicate ideas to his friends and neighbors which will enable them to raise produce under equally advantageous conditions. As a member of the Branch he not only partook in the exchange of practical information, but he also participated in the distribution of seeds, &c., for experimental purposes, and received free copies of the *Journal of Agriculture* and other agronomical literature, and was kept well up to date by the information therein contained.

TREE LUCERN—The Chairman wished to know how far apart to plant tree lucern (*Cytisus proliferus*). [About 6ft. to 9ft. apart for breakwinds, and half the distance if grown for fodder only.—GEN. SEC.]

Lipson, August 27.

Present—Messrs. G. Provis (in chair), H. Brougham, S. Burt, Jas. Brown, W. T. Darling, C. Provis, J. Wishart, E. J. Barraud (Hon. Sec.), and two visitors.

SOURSOPS.—Mr. Brown reported that there was a little of this weed near Tumby, but no steps had been taken to destroy it. Other members were unacquainted with the weed.

POTATOES.—Mr. C. Provis initiated a discussion on the best mode of planting potatoes. It was agreed that the cut side of the sett should be uppermost on dry soils, and down in wet.

STANDARD WEIGHT FOR CHAFF.—A resolution favoring the adoption of a standard weight of 40lbs. per bag of chaff was passed.

EARLY WHEAT.—Mr. Brougham tabled a few shoots of wheat over 4ft. in height, with ears nearly 5in. long, a fair sample of a five-acre paddock.

Paskeville, August 27.

Present—Messrs. A. C. Wehr (Chairman), G. Meier, A. Goodall, A. Bussenschutt, F. Bussenschutt, T. Trebilcock, A. Palm, and J. H. Nankervis (Hon. Sec.).

SOURSOPS.—Mr. Goodall said this weed existed in his land, having been introduced as a garden flower. He was in a fair way to extinguish them, applying salt to the affected patches, and also covering with straw occasionally, and setting fire to it. Other members reported this weed in small quantities on their farms, and they intended dealing with it in the way indicated by Mr. Goodall.

MANURING.—Mr. Palm tabled samples of wheat and barley fully 3ft. high, and just coming into ear. They were grown on land manured with 2cwts. English super per acre, broadcasted.

Norton's Summit, September 3.

Present—Messrs. J. Jennings (Chairman), J. J. Bishop, C. W. Giles, A. Smith, J. Hank, J. Pellew, and W. H. Osborne (Hon. Sec.).

OFFICERS.—Messrs. Jennings and Osborne were re-elected Chairman and Hon. Secretary respectively for ensuing year. Other formal business was transacted.

Maitland, September 3.

Present—Messrs. H. Pileher (Chairman), C. F. G. Heinrich, H. R. Wundersitz, J. Kelly, W. Wilson, J. Hill, O. Treasure, and C. W. Wood (Hon. Sec.).

SOURCES.—Members reported existence of this weed in small patches in various parts of the district. They were keenly aware of the necessity for eradicating it before it spread further. It was agreed that the weed had been introduced with fruit trees from the Adelaide nurseries. Mr. Wundersitz said he found a few plants came up round a newly-planted fruit tree. He grubbed up the tree, and made a large fire on the spot, which seemed to have destroyed the patch of bulbs.

MANURES.—This Branch is of opinion that sellers of super-guano should be compelled to give detailed analysis of this manure, as at present they decline to do so. [Buyers should absolutely decline to deal with anyone who refuses to comply with the provisions of the Act by failing to give an analysis of the fertiliser he sells.—GEN. SEC.]

GREEN FEED.—Mr. Hill recommended Cape barley as the best plant to grow for early winter feed. Mustard grew well, but was likely to taint the milk, especially when in flower and later.

Kapunda, September 3.

Present—Messrs. W. G. Teagle (Chairman), J. P. Orchard, W. Flavel, J. A. Schultz, J. H. Pascoe, J. O'Dea, J. J. O'Sullivan, Peter Kerin, H. T. Morris, G. Harris Pat. Kerin, T. Scott, and T. Jeffs (Hon. Sec.).

SOURCES.—This pest is spreading in the district.

OFFICERS.—The Chairman and the Hon. Secretary were re-elected, and thanked for their past services.

BROADLEAF MUSTARD.—Chairman tabled a fine plant of broadleaf mustard.

Crystal Brook, August 27.

Present—Messrs. George Davidson (Chairman), W. Hamlyn, W. Natt, W. J. Venning, E. Dabinett, A. Fergusson, E. Pope, and George Miell (Hon. Sec.).

SOURCES.—This weed is very prevalent here, generally near young fruit trees. Members recommend that this weed shall be destroyed wherever found. [Cut off every leaf directly it comes through the soil, and in a year or two the plants will be killed.—GEN. SEC.]

MANURES, &c.—It has been found that some commercial fertilisers are of very little value, owing to adulteration with useless substances. [Members can have any soil or manures analysed by the Government Analyst, at a cost of 3s. for each definition—thus, phos. acid, 3s.; nitrogen, 3s.; &c.—by forwarding samples with cash to this office. Every person selling fertilisers *must*—not “may”—give a statement of its exact constituents with each bag.—GEN. SEC.]

FIELD TRIALS.—Following on the day after the Crystal Brook show, the North-Western Amalgamated Bureau Field Trial Society held a field trial of agricultural and horticultural implements. The following are the particulars:—

Mr. W. J. Martin, of Narridy, exhibited his patent ploughshare, which stood splendidly the severe test it was subjected to. The trial of stumpjump ploughs was hardly satisfactory on account of the horse-tackling not standing the strain of such rough work. Mr. C. H. Smith's ploughs worked right through, and deserved the judge's remarks of “well worthy.” Mr. Smith comes from Ardrossan, and has taken fifteen first prizes in field trials. The South Australian Implement Company had a full line of Planet Jr. garden implements on the ground,

and a working exhibition was given. A double-wheel hoe was shown in operation; also a weedcutter, cultivator, rake, furrower, and plough, which gave great satisfaction. The Planet orchard cultivator was next in operation, and the work of cultivating, hoeing, furrowing, earthing-up, and cutting furrows for water-drains was done in excellent style. This machine was exhibited for the first time. The judges expressed much admiration for the work done. Clutterbuck Brothers showed a drill equipped with patent cultivator attachment, broadcast scattering-tubes to sow grain and other seeds. It was worked in very rough land, recently ploughed in the competition, and negotiated the high stumps, which were fairly thick, in a first-class manner. A 17-tooth stumpjump cultivator was also worked in the same land, and proved highly successful. Norman & Co. displayed novelties in the shape of a two-furrow plough by the Syracuse Chilled Plough Company, and two different sets of harrows. The spiketooth harrows, with lever for altering the set, received a great deal of attention. The Superior drill was also on the ground. The following is the prize-list:—Stumpjump three-furrow plough, J. Martin & Co.; stumpjump do., five furrows, C. H. Smith ("well worthy"); stumpjump do., six furrows, C. H. Smith ("well worthy"); paring ploughs, six furrows, Bartle & Morphet; stumpjump paring plough, six furrows, J. Martin & Co.; plough, scarifier, or cultivator, with seed and manure drill attachment, Clutterbuck Brothers; stumpjump cultivator, thirteen or more times, Clutterbuck Brothers; improved cultivator, Clutterbuck Brothers; wrought-steel ploughshares, W. J. Martin, C. H. Smith; device for reversible ploughshares, J. Martin and Co.; steel scarifier shares, J. Gilbert; device to make scarifier shares reversible, J. Gilbert; device of wheels or axles for either ploughs or scarifiers, Bartle and Morphet; set of ordinary harrows, six leaves, with attachments, Norman & Co.; collection of imported implements for gardening, S. A. Implement Company ("well worthy"); newly-invented plough, Norman and Co., S. A. Implement Company; imported plough, Norman & Co.

Port Pirie, August 30.

Present—Messrs. H. B. Welch (in chair), T. Gambrell, G. Hannan, G. M. Wright, F. R. Humphris, and R. J. Ferry (Hon. Sec.).

SOURCES.—Mr. Gambrell reported that this weed existed in a garden at Nelshaby, while Mr. Humphris stated it was very prevalent in one locality at Telowie. Reference was also made to the prevalence of the weed known as three-cornered or prickly Jack (*Emex australis*).

PRUNING.—A discussion took place on paper read by the Hon. Secretary at previous meeting on vine pruning, and members were of opinion that the system advocated in the paper was the best for the western slopes of the Flinders Range.

Caltowie, September 5.

INAUGURAL MEETING.

Present—Messrs. G. Lehman, A. McDonald, G. Pctatz, J. Potter, J. Neate, D. Wilson, and R. Walsh.

OFFICERS.—Messrs. G. Lehman, S. Amey, and R. Walsh were elected Chairman, Vice-chairman, and Hon. Secretary respectively, and other matters connected with the working of the Branch were discussed.

Bowhill, August 26.

Present—Messrs. J. G. Whitfield (Chairman), E. Smith, A. Dohnt, E. Weyland, G. Brown, C. Drogemuller, W. Towill, J. McGlashan, W. G. F. Plummer, J. Waters, H. H. Plummer (Hon. Sec.), and one visitor.

WEEDS.—Mr. Plummer called attention to prevalence of the wild carrot in parts of the district. Mr. Towill said it was indigenous to the river lands. Mr. Drogemuller said the rainfall was too dry to allow it to make much headway on the cultivated lands.

STANDARD WEIGHT OF CHAFF.—With one dissentient a resolution was carried favoring the adoption of a legal standard of 40lbs. net for bag of chaff.

Colton, August 2.

Present—Messrs. W. J. Packer (in chair), J. L. Higgins, M. S. W. Kenny, G. Mayers, J. Shipard, E. Whitehead, M. L. Crowder, and R. Hull (Hon. Sec.).

CABBAGE APHIS.—Mr. Mayers said that many years ago he was employed in a garden where this pest was kept under by continually going over the plants and brushing the leaves with a soft brush dipped in a mixture of one tablespoonful liquid ammonia, 1lb. soft soap, and 3galls. of water. Other members stated that an infusion of wormwood or tomato leaves was effectual in getting rid of this pest; but it was necessary, whatever was used, to keep at it until the aphid disappeared.

SOURSOPS.—Mr. Higgins said he had some of this weed growing round a lemon tree obtained from Adelaide. Some members stated they had a few plants in their garden, but would speedily eradicate them now they are aware of the danger of their spreading. Members wished to know whether salt would destroy the weed. [Heavy dressing of salt or arsenic will destroy these weeds, but the patches treated will not grow anything else for two or three years at least—GEN. SEC.]

BUNT—Mr. Mayers read a paper on "Pickling Wheat," to the following effect:—

During the past twenty years he had tried various ways of pickling wheat for the prevention of bunt with fairly satisfactory results, and he had now adopted the following method, as he found it the quickest, easiest, and most satisfactory. He rigged up a lever to one of the cross beams in the shed with a piece of chain in such a way that he could turn it at least half way round. He then got a 200gall. iron tank, removed the top, and coated it inside with three coats of boiling tar to prevent the bluestone eating away the iron. The tank was placed in position and the wheat, half a bag at a time, placed on stand about 18in. high. Bran or potato bags are best to use, as they admit the pickle freely. Take a piece of plough twine about 2ft. long, with the ends tied together, put it round the bag close down to the grain and put one tight through the other; pull it tight, and with a S hook attach it to the chain. The bag is then raised into the tank and left in the pickle while the next bag is being prepared, then raise on to a platform across the tank to drain. He used 1lb. of bluestone to three bags of wheat, as he found it just as effectual, and the wheat came up earlier and better than if $\frac{1}{2}$ lb. to the bag was used. He had tried washing the bunt balls off the wheat, but he would not advise anyone to sow bunted wheat unless absolutely obliged to. Wheat sown early need not be pickled if it is clean, but after the soil is well wetted all grain should be pickled.

Considerable discussion ensued, members being unanimously of opinion that bluestone was the best pickle.

WOOL-CLASSING.—The Hon. Secretary read a paper on "Will it Pay Small Sheepowners to Class their Wool?" He commended the paper read by Mr. Jeffrys at Forest Range, but regretted more information as to how the wool should be classed was not given. He strongly recommended small sheepfarmers to class their wool. Where they were beaten by the large station-owners was in not culling out before shearing all sheep with sticky necks, sandy backs, yellow and short fleeces. These should be sold off at any price. One reason why small growers have so many of these sheep in their flocks is that they purchase old ewes from stations where culling is practised and, mating these with inferior rams, the result is a serious deterioration from an already inferior standard. An effort should be made to get the flock as even as possible, as it will not pay the small grower to make more than three classes, i.e., fleeces, pieces, and locks. The fleeces should be rolled up neatly and tied with a piece of its own wool. Roll from neck to tail, catch up a piece of one hip, roll it out into a string and tuck it round the fleece. Put each fleece aside until you have sufficient for a bale—about sixty on an average. Take out all short pieces off the legs, head, neck, and belly and put them aside to be made up separately. Be careful to leave no stain on the belly or tail of fleeces. Clean out all manure and rubbish from the pieces before baling—the same applies to the locks. He considered a baling press absolutely necessary. He

thought it a pity the woolbuyers did not offer instructions to the small growers, showing how the wool should be got up, so that there might be more uniformity. He was surprised that none of the manufacturers send their buyers to buy direct from the station or shears. Mr Kenny asked whether small lambs should be sheared, as it seemed to him an unnecessary expense. Members said they should, as the lambs would thrive better, and the wool become denser and less liable to take in sand.

Boothby, August 30.

Present—Messrs. J. F. Whyte (Chairman), J. Bell, H. S. Robinson, and R. M. B. Whyte (Hon. Sec.).

BUSINESS.—Owing to the very wet weather, over 2in. falling in two days, the attendance was poor, and only formal business was transacted.

Lucindale, August 27.

Present—Messrs. E. Hall (Chairman), G. C. Newman, E. Tavender, E. Dutton, J. Bourne, A. Dow, W. Dow, A. Matheson, L. McInnes, A. Lobban, J. Nilan, H. J. Deeble (Hon. Sec.), and two visitors.

SOURCES.—Two members reported existence of this weed in their gardens, having come in the roots of fruit trees obtained from Adelaide.

STANDARD WEIGHT OF CHAFF.—It was resolved that this Branch approves of the adoption of a standard weight of 40lbs. net for bag of chaff.

MANURES.—Members were of opinion that the seller of fertilisers should be held responsible for any adulteration of same.

PEACH APHIS.—This pest was reported to be increasing in the district. Mr. Langberg said he put a gallon of tar round the roots of affected trees, but it did no good. Mr. Hall said he removed the earth from the roots, put in some fresh dry quicklime, and covered it again with earth. He found the black aphid quite cleared, and the woolly aphid nearly so.

COUCH GRASS FOR STOCK.—Mr. Dutton reported that lambs placed in paddock containing a quantity of couch grass got sore mouths during the wet weather. Mr. Newman said he had a similar experience, but on removing the flock to a paddock free from the weed they got better in a week.

WATTLE CULTIVATION.—Mr. Newman read a paper on this subject.

He had great confidence that this could be made one of the most profitable industries of this district, as the soil, climate, and the facilities for delivering the bark at a seaport are all that can be desired. He saw part of a plantation east of Adelaide stripped; the yield being four tons per acre, and enough small wattles being left to make another good yield in two or three years time. The price obtained for the bark was £5 5s. per ton in the field; the price paid for stripping was £1 5s. per ton, which included cutting the trees down and packing them in heaps; the landowner receiving £4 per ton clear, equal to £16 per acre. The land was of poor quality, being very stony and sandy. During the past ten years he had experimented in wattle-growing in this district, and proved that they can be grown on almost any land that is over 3ft. above the level of the winter flood waters. A few months ago he stripped a wattle seven years old that gave over 1cwt. of bark fit for market. Trees of that size standing 20ft. apart each way would give over 5 tons per acre. That tree was grown on a limestone ridge (red soil), and he had them of nearly equal growth on the fern hills (white sand). As there are thousands of acres of open fern land in this district almost useless for grazing, and eminently suited for wattle-growing, he would strongly urge leaseholders to give that industry a trial. Such land is leased at from 3d. to 2d. an acre annually. About four years ago he planted one acre of fern land, and now estimates the wattles on it to be worth £8 to £10. Although the wattle has never been systematically cultivated at Mount Benson in the Kingston district, still it grows there over a considerable area, and last season no less than 1,200 tons of bark was stripped and sent to market, the price received ranging from £3 15s. to £4 per ton; and as stripping costs £1 per ton, it means £1,200 being distributed amongst the laboring

classes of the district, and about £3,500 amongst the landholders and teamsters. The bark grown at Mount Benson is deficient in tannic acid, consequently a lower price has to be taken. Where only a small area is to be planted he found the following a good plan :—Commence at one side of the field, using a double furrow plough, strike out the length of the piece to be planted, then mark out back again parallel with the first furrows and about 8ft. away from them, and so on through the field. Then take 1lb. of good seed for each acre, place in a vessel and cover with boiling water, and allow them to soak for twenty-four hours, then drop them regularly along the ploughed strips and cover with a harrow. The next year it will be necessary to thin out the plants in the rows to the required distance. Where large areas are to be cultivated it would save time and labor to have a box fitted to the back of the plough with a roller through it, and worked by a belt with the rear wheel, and so made to drop a seed or two at each revolution, and a small harrow attached would complete the planting in one operation. One team should do eight acres a day. About every five chains it is advisable to leave a strip 16ft. wide unplanted for the purpose of drawing furrows in summer to check a possible fire, and later on as a roadway for carting out the bark. He could not recommend broadcast sowing, as there is so much more labor in ploughing all the land, and the work of thinning out the young plants is very much greater. He would strongly advise that only seed of the true broad leaf wattle should be planted, as it is doubtful whether it will pay to grow any other variety, the bark of which will be worth quite 20 per cent. less. Horses may be allowed the free run of a wattle paddock, but cattle should be kept out altogether, and sheep should not be allowed in until the tops of the plants are out of reach, as they are very fond of the young shoots. He felt certain that if the bark had no market value it would pay well to plough fern hills, and sow three or four pounds of seed per acre broadcast, and keep all stock out for three years, by which time the wattles would provide a very large amount of feed for either cattle or sheep.

Morgan, August 27.

Present—Messrs. J. Jackman (Chairman), A. Stubing, R. Windebank, L. Stubing, T. T. Schell, G. Roediger, J. Bruhn, and J. Wishart (Hon. Sec.).

SOURCES.—Members reported this weed was not known in the district, but they would keep a careful lookout, and eradicate any plants should they appear.

Petersburg, August 27.

Present—Messrs. W. Miller (Chairman), A. Dowd, R. Cochrane, D. O'Leary, J. M. Cadzow, H. Earle, W. Heithersay, and J. Wilson (Hon. Sec.).

DEEP SOWING.—Mr. Earle showed plants of wheat showing the effect of sowing the seed too deep. It had been covered to a depth of about 4in., and had put forth adventitious roots at points near the surface.

AYRSHIRE BULL.—The Chairman reported that the Minister of Agriculture had promised to station an Ayrshire bull in this district to replace the Branch bull which died during the past season.

DISEASE OF CATTLE.—Mr. Cochrane read a paper on this subject to the following effect :—

During the past two years a disease of a somewhat mysterious nature has attacked my dairy cattle, and terminated fatally in every case. As I have had numerous inquiries of the symptoms, treatment, and probable cause of death, I have prepared this paper giving all the information available, and I hope that some members of other Branches will be able to throw some light on the matter. The disease first appeared in November, 1896, and was the cause of the death of six cows. When attacked the cow appears dull, her head hangs down, and she walks with a stiff gait, she constantly lies down, and is made to get up with difficulty, will only remain standing a short time. I immediately sent for Inspector Needham, but unfortunately all the cows were dead before his arrival. Hearing the symptoms he attributed the cause of death to impaction of the omasum caused through improper food. The bible of the stomach of the first that died were certainly hard and dry, but as others have died since in the spring of the year while in the very best of condition with nothing apparently wrong with the stomach, it is evident that this is not the true cause of death. In May of 1897 the cattle were again attacked, several of them dying; with one exception what remained of the herd, and including the Bureau bull, died in October of the same year; the cattle at this time were in splendid condition. Soon after this I purchased two cows in Jamestown, and also

two from Yatina district. After being a month on the farm these, with the cow which previously survived, were attacked, and all died within a few days. The cattle were grazing over an area of about 1,300 acres, 150 being scrub grass land, the balance being cultivated once every four years. It has not been overstocked, and although feed has been scarce through the drought the cattle were never in very low condition, as I always had wheat chaff and straw to help them through the worst parts of the year. At intervals during the summer of 1896-7 I removed the cows to other farms at Yongala and Yatina, where there was plenty of green buckbush and weeds. I fed them with chaff and bone meal, as recommended by the inspector, and also gave them 4 tons of potatoes. With the exception of two cows from Gawler district, and those mentioned from Jamestown and Yatina, the rest of the cattle were all bred on the farm, and were the result of twenty years' selection. Until this disease appeared they were always in good health. I drenched the cows according to Inspector Needham's directions, but with no beneficial result. On the Inspector's visit in October he diagnosed asthenic apoplexy, caused through want of phosphates and other principles in the soil. This, I think, is scarcely correct, as no other cattle that I know have died in the district from the same cause. My farm, which is a fair average of this part, has been cropped less than almost any other in the district. Even allowing that the soil is deficient in phosphates, I do not think the cattle would die in such a short time after coming on the farm. Mr. Botttrill, of Yarcowie, has cured cows suffering from apparently the same complaint by giving them alternate drenches of aconite and nux vomica in water and by rubbing each side of the spine with turpentine and keeping them well covered with fresh sheep skin. I treated one yearling bull in this manner, but met with no success. None of the cattle died while away from the farm. I lost altogether thirty-two head.

Arden Vale, September 5.

Present—Messrs. A. Hannemann (Chairman), M. Eckert, C. Pearce, F. Schutloffel, A. W. Fricker, L. Warren, D. Liebich, J. Francis, G. Miller, E. H. Warren (Hon. Sec.), and several visitors.

NEW PLOUGH.—The Hon. Secretary and Mr. Liebich reported on Mulligan's patent paring plough. They were of opinion that four furrows would be enough for a six-horse team in this district; that the spring contrivance for regulating the stump-jump capabilities of the implement was an improvement, but that mould boards of usual slope were better than those fixed at almost right angles.

MANURING.—Mr Eckert said the effect of the application of Thomas phosphate last year was plainly apparent in the crop this year, and the failure last season could only be attributed to the drought.

BLINDNESS OF CATTLE.—Members reported that cattle depasturing on the porcupine ranges gradually become blind. They have suffered severely during the drought, and have been running on very rough country, the feed being principally porcupine grass. [This is probably due to injury by the sharp points of the porcupine grass. Carefully remove any grass seeds from the eyes, and bathe twice a day in warm water containing a little sulphate of zinc.—GEN SEC.]

ANNUAL REPORT.—The Hon. Secretary's annual report showed that the drought had greatly militated against the work of the Branch, but during the year six meetings were held with an average attendance of 8.5 members. Six papers were read and discussed and a number of other subjects of interest dealt with. Two homestead meetings were held with satisfactory results.

Millicent, September 1.

Present—Messrs R. Campbell (Chairman), S. J. Stuckey, H. F. Holzgreffe, H. Hart, H. Oberlander, W. J. Whennen, A. McRostie, H. A. Stewart, B. Varcoe, W. R. Foster, and E. J. Harris (Hon. Sec.).

HOLSTEIN CATTLE.—Mr. Holzgreffe reported that the Holstein bull loaned by the Department to the Branch had arrived safely. He had been looking

up reports as to the butter production of Holstein cows, and found the following yields of cows of improved herds in United States recorded:—Pauline Paul, weighing 1,250lbs., gave 1,153lbs. of butter in a year, or an average of 22lbs. per week. Mercedes gave 99lbs. 6½ozs. butter in a month. Mechthilde gave 150lbs. 8ozs. in a month. Lady Baker, in seven days, gave 34lbs 6ozs. Se Kol II. 33lbs. 6ozs. Bettina 32lbs. 1½ozs. Galesa III. 32lbs. Parthenia 38½lbs. Taking 12½lbs. to 13lbs. of milk to produce 1lb of butter. Pauline, owned by Messrs. Henry Stevens & Sons, of New York, won the first prize in the official butter prize test, offered by the Holstein Friesian Association of America. The cow's equivalent record, made with the Babcock test, was 27lbs. 1½oz. in seven consecutive days, the milk averaging 4.39 per cent. butter fat for the week. With reference to the dairy Shorthorn, mentioned by Mr. Thomson, they had been tried in Mount Gambier and, though they were very good milkers, they were not hardy enough for the South-Eastern climate.

SOURSOPS.—This weed was reported to have been received with fruit trees obtained in Adelaide, and mention was made of the difficulty of eradicating it. The weed is not known to exist to any extent in the district.

ORANGE TREES.—Mr. Whennen was advised that now was a good time to plant orange trees, but they would only succeed where they could be given at least one good soaking before the summer sets in.

INSECTS.—Mr. Oberlander tabled small insects about the size of fleas, of a slaty blue color with red or yellow legs. These were in myriads in his garden, and were particularly voracious. He found strong soapsuds an effectual destroyer. Mr. Foster said this pest was bad in the vicinity of Rendelsham.

HOMESTEAD MEETING.—This meeting was held at the residence of the Hon. Secretary, and after the business of the meeting had been concluded, the members inspected the outbuildings, gardens, &c., and were entertained at tea.

Renmark, September 5.

Present.—Messrs. H. Showell (Chairman), W. H. Harrison, W. H. Waters, R. Kelly, and E. Taylor (Hon. Sec.).

SOURSOPS.—Members reported that this weed existed in many orchards here, having been introduced in the earth round the roots of fruit trees sent from Adelaide. It was decided to make war upon the weed without delay.

COUCH GRASS.—This plant is the worst weed the residents have to contend with, and proves a great hindrance to cultivation; in some orchards it has become so bad that it is impossible to work the scarifiers satisfactorily. The drawback to the application of any chemical is that the irrigation water on most of the blocks passes through the patches of weed. Members would like to know if it is possible to kill the grass without injury to the trees. [The only way to kill couch grass is to dig out every root, and at once destroy every shoot that may appear afterwards.—GEN. SEC.]

Forster, August 29.

Present.—Messrs. A. Johns (Chairman), C. Bolt, J. R. Bolt, J. Sears, W. Johns, F. Johns, J. Johns, J. Retallack, H. Fidge, C. Topsfield, A. Retallack, F. Towill, W. H. Bennett (Hon. Sec.), and twenty-five visitors, including several members of Bowhill Branch.

DAIRYING.—Mr. G. Brown, of Bowhill, gave an interesting address on dairying and the advantage of a co-operative butter factory to the district. Mr. A. Wight, of the S.A. Farmers' Co-operative Union, gave an address on "The Advantages of Co-operation."

Brinkworth, September 1.

Present—Messrs. S. Auger (Chairman), J. Graham, J. F. Everett, W. H. Pearce, and J. Stott (Hon. Sec.).

SOURCES.—Members reported this weed very scarce in the district.

CULTIVATION.—Mr. Everett read a paper on "The Cultivation of the Soil" to the following effect:—

In his opinion fallowing should be started as soon as seeding is finished. From 3in. to 4in. is sufficient depth to plough for two seasons in this district, but the next time he would go about 5in., to prevent the formation of a hard pan. With deep ploughing it is difficult—especially in dry seasons—to get the soil firm enough, however well it is worked, unless the winter is wet. As soon as ploughing is finished harrow lightly to level down the furrows. The sooner this is done the better if the soil is turned up moist. If this work is left for a time, and dry weather sets in, it is difficult to get the soil to work nicely, with the result that it remains rough and lumpy—a very undesirable state of things. Having the land ploughed and harrowed before the end of July, you have plenty of time before hay-making to give the further cultivation necessary to keep the weeds down. Never put the scarifiers on in spring if the land is wet, as in our clay soils it causes caking. By scarifying across the furrows you make a better job of cutting up the weeds and levelling the soil to make good working for the harvesting implements. After the scarifier put on the scarifier-harrows, as there is nothing better for pulverising and working the soil down to a good seed-bed. These should always be used in fine weather. With two teams of five horses and two sets of harrows of three leaves between thirty and forty acres can be covered in a day. On mullused land the use of this implement is out of the question. Without exception he found he got the best results from his fallows treated in this way. This work will about carry us up to hay harvest, and with a few sheep to keep down any weeds that may grow the fallow may be left until after harvest, unless we get heavy summer rain. If such occurs it is advisable to run either the scarifier or scarifier-harrows over the land to destroy cockspur and other weeds that will germinate. About the middle of March or beginning of April the work of preparing the fallow for seeding should be commenced, using the scarifiers. Commence sowing about the middle of April, or even a little later. The portion that has been scarified should be sown and the scarifier-harrows run over it, followed, if necessary, by the light harrows. The portion not scarified he would sow in front of the scarifier, and run the light harrows behind. If the weather is dry roll as much as possible. This, of course, applies to the old system of broadcasting.

Willunga, September 3.

Present—Messrs. W. J. Blacker, M.P. (Chairman), Thomas Pengilly, A. Slade, J. Allen, T. Atkinson, J. Binney, Joseph Valentine, and C. Bray (Hon. Sec.).

POTATO DISEASE.—Several specimens of potato leaves showing black and yellow spots caused by some disease were shown.

WOOL-CLASSING.—Some discussion on this subject took place, after which members adjourned to inspect the school experimental plots.

Arthurton, August 25.

Present—Messrs. W. Short (Chairman), W. H. Hawke, H. J. Freeman, J. Koch, C. Koch, W. Smith, J. Pearson, M. Baldock, H. Baldock, T. B. Wicks, J. B. Rowe (Hon. Sec.), and two visitors.

FIELD TRIAL.—It was decided to recommend that a new and improved form of certificates be used in connection with future trials under the auspices of the Field Trial Society.

MANURE.—Mr. Wicks asked whether, in the opinion of members, commercial fertilisers—particularly English super—would injure the grain. He was afraid it would, and thought that with very little trouble a drill could be made to put the manure at a different depth to the seed. Mr. Hawke thought Mr. Wicks could easily satisfy himself on this point. Let him mix, say, 50 grains of wheat with the super, and sow it, and sow the same quantity without

manure and see which had the most misses. Mr. Pearson said his wheat sown with the manure was much better than that sown without, and he could not see how it could be said to injure the grain. Other members agreed. The Hon. Secretary said he was trying experiments with a number of fertilisers, and so far the best results were from a mixture of English super and guano.

Appila-Yarrowie, August 29.

Present—Messrs. J. Wilsdon (Chairman), J. C. W. Keller, C. W. H. Hirsch, N. Flannagan, J. H. Bottrall, W. Stacey, J. O'Connell, J. Daly, W. C. Francis, J. H. Klemm, J. W. Hill, C. G. F. Bauer (Hon. Sec.), and two visitors.

PAPER.—Mr. Wilsdon read an interesting paper describing his experiences in April, 1865, when, on a journey from the Burra to North-West Bend, he missed the track, and getting too high up was lost for eight days in the scrub, eventually striking the Darling above Wentworth, after a trip of over 300 miles.

Hawker, August 31.

Present—Messrs. A. C. Hirsch (Chairman), S. Irvine, C. W. Pumpa, J. Hill, H. M. Borgas, W. J. Schuppan, T. Laidlaw, C. E. Harry, and J. Smith (Hon. Sec.).

OFFICERS.—Messrs. A. C. Hirsch, S. Irvine, and J. Smith were elected Chairman, Vice-chairman, and Hon. Sec. respectively for ensuing year.

SOURCES.—Members reported this weed was not existent in the district, and expressed the hope that residents obtaining trees from the Southern nurseries would be careful to remove all soil from the roots and burn it.

SHEEP.—Mr. Irvine read a paper on "Management of and Class of Sheep for the Farmer," to the following effect:—

He had had thirty years' experience with sheep, principally in salt and cotton bush country, with rainfall of about 6in. This country carries about a sheep to six acres if well managed. Unfortunately sheep seem to kill out salt and kindred bushes, no doubt on account of the constant eating off of the leaves, which prevents the plants absorbing the necessary nourishment from the atmosphere. When feed and water are fairly plentiful this class of country is admirably adapted for stock, the Merino sheep in particular growing to an extra size and fattening better than in cooler climates. It is unfortunately a fact that thousands of sheep in our northern country never pay their owners for the reason that they are too old or else a bad class of sheep. For this country the Merino is the best, both for sheep and mutton, being harder, more contented, and able to travel farther to feed and water than any other breed he knew of. Many writers advocate various crosses for the farmers, but the climate and other conditions of each district must be considered. The Merino appeared to him to be specially adapted to their hot dry district. The Shropshire breed is reputed to be wonderfully hardy, and, as they all knew, was a splendid butchers' sheep, besides carrying a good fleece. This might do here, but the high price asked for good sheep of this breed probably accounts for it being so seldom seen in the farmers' flocks. In starting their flocks a good many farmers buy anything, without troubling themselves about the quality of wool and mutton they are likely to produce. This is a great mistake. For our district the farmer should see that any sheep he buys has wool of good quality, close set. It was a very easy matter with stock and wool at a high price for an inexperienced man to make stock pay, but even then those who made the best profit were those who gave their stock the most intelligent attention. In these times of low prices it requires the most skilful management to make things pay, and a good manager must be intelligent, energetic, observant, and systematic. His intelligence and powers of observance will enable him to note the characteristics of the land and climate, and to judge how to make the best of his conditions. His energy and system will enable him to carry out satisfactorily what his intelligence and observance suggest is necessary. Some are better qualified than others in selecting and mating stock, but with careful practice everyone can improve himself in this respect, and it is only by taking an interest in the business to hand that one finds life on the farm or station a pleasure and the results profitable. A good manager will see that his stock are properly cared for at every stage.

If possible, the ewes at lambing times should be separated from the rest of the flock and be placed where there is the best feed. In a mixed flock there is bound to be a large percentage of losses of lambs, especially amongst shepherded sheep. The lambs at weaning should have the best feed available, as if not well nourished then they will never grow into robust profitable animals. Owing to the variation in the quality of the land on the same holdings it is difficult to give all the stock an equal chance, and all that can be done is to adopt a judicious system and avoid overstocking. Prior to stocking land it should be tested for water, whether from sinking or permanent waters or by means of dams. Owing to the sparse rainfall the latter must be looked upon only as a last resource. Water must be obtained before the stock is put on, as sheep feeding on saltbush without plenty of water will not thrive well. If a farmer has to shepherd his sheep, as most have to do here unless their paddocks are dog-proof, care should be taken that the hut and yards are not close to the water and that the sheep are taken in different directions each day to feed. Sheep do better if allowed two or three hours feeding before going to water, and should not be driven straight away after drinking, especially in summer time. Sheep like to take water a little at a time, and if at all frightened will scarcely drink anything however thirsty they may be. He considered about 11 a.m. the best time to take sheep to water, and finds that when they become accustomed to it they will generally go of their own accord about this time. Shepherding will not pay unless the farmer has a good-sized flock. During shearing time the sheep should be classed and culled. The wool should be carefully skirted and each kind or class kept distinct. Do not overstock, but rather endeavor to get an increased quantity of wool of better quality from fewer sheep. This, of course, can only be done by culling out inferior sheep and selecting rams for mating which will, in the opinion of the stockowner, produce the class of sheep most profitable to him.

The Chairman considered the Shropshire the best for lambs, as they matured quicker than other breeds, enabling the farmer to place them in the market to the best advantage. The lambs should be dropped in April, and at three months will readily fetch about 5s., while the ewe should cut wool to the value of 2s. 6d. Mr. Irvine said farmers should endeavor to have their yards east of the watering place, so that the sheep would be feeding in their own shadows. Sheep do not feed so well if facing the sun; this of course applied to shepherded sheep. The Chairman said he was glad Mr. Irvine had referred to this matter, as, although most important, very few people pay any attention to it.

BINDER TWINE IN CHAFF.—The Hon. Secretary called attention to the injurious practice of cutting up binder twine in the chaff. The string accumulated in the stomach, and, forming into a ball, caused stoppage. Several residents had complained to him about this, and he thought it quite time that steps were taken to prevent chaff merchants cutting up the twine. Probably if those in the habit of doing this had their attention drawn to the injurious effects of this practice they would have the twine removed from the sheaves. He hoped the other Branches would take this matter up.

WEEDS.—The Chairman stated that the weed known as squash weed, which did so much damage in the crops, could be destroyed by harrowing. Early fallowing would do away with the trouble. If the land cannot be fallowed early it should be scarified before the weed flowers. If these weeds are ploughed in many are not completely covered and so grow again.

Lyrup, September 6.

Present—Messrs. A. Thornett (Chairman), F. E. Chick, R. W. Skelton, T. R. Brown, D. J. Bennett, A. Pomeroy, R. Layton, T. Nolan, P. Brown, O. Klemm, W. H. Walling (Hon. Sec.), and three visitors.

SWEDE TURNIPS.—Several good firm samples of Monarch Swedes were tabled. These were sown on April 16, and without manuring or special cultivation had done very well.

ENSILAGE.—Mr. Skelton said the ensilage made from paddymelon was scarcely a success. It was rather too moist, and should be mixed with dry feed. While there is plenty of other feed the cows will scarcely touch it.

MAIZE.—Mr. Skelton read a paper on this subject to the following effect :—

Maize is a native of America, and was found under cultivation when the New World was discovered. The maize crop of the world is estimated at from 2,000 millions to 2,500 millions of bushels, which, valued at 2s. per bushel, gives a total of from £200,000,000 to £250,000,000. The United States produces about three-fourths of the whole amount, and Australia eight or nine million bushels. From statistics published in the *Agricultural Gazette of New South Wales*, the average yield per acre for the previous ten years of the principal maize-growing countries of the world was :—United States, 23bush. per acre; Spain, 25; Portugal, 25; Italy, 20; Austria, 16; Australia, 29; and Argentina, 10bush. Maize is grown principally as a food for stock in this country; but in the United States it enters extensively into the social life of the American people. Maize corn as a food for stock is in itself too concentrated; but when the whole cob, pith and all, is ground up together it makes an excellent hard feed for horses. Maize in its green state is an excellent fodder for milch cows, and by adopting the system that is carried on extensively in America, of allowing the crop to stand till the grain has just started to harden, it is quite possible to obtain a fair yield of grain and also 10 tons or 15 tons of good ensilage per acre. The grain will be probably a trifle shrunk, but will nevertheless be very good feed. The stalks will require to be chaffed, being rather too dry for stack ensilage. According to the Department of Agriculture, Washington, one acre of maize stalks (after the cobs have been taken off) contains about 900lbs. of sugar. Large quantities of maize-hay are now made in America, and the McCormick Binder Co. have invented a machine which cuts and binds the maize, leaving the bundles standing behind it. One of these machines worked very satisfactorily at Hawkesbury College, New South Wales. Although maize grows well on different soils (having been known to produce a fair crop in a soil containing 90 per cent of pure sand), the most suitable soils are rich sandy loams such as are found on the Hawkesbury river, New South Wales, and the King and other rivers in the Gippsland district of Victoria; 100bush. per acre is not an uncommon occurrence in the localities named, and as much as 120bush. per acre has been harvested on the Hawkesbury, and 160bush. per acre in Gippsland. Maize is a gross feeder, and a liberal application of good stable manure will always pay. Failing that, a good phosphatic manure is recommended. An experiment was made at Hawkesbury College, New South Wales, with twenty-one different kinds of manure at the rate of 30s. worth per acre. Albert's phosphate gave the highest return, viz., an increased yield of 46bush. per acre, and blood manure was the lowest, with an increased yield of 16½bush. per acre. One great reason for want of success in maize-growing is want of cultivation. If it is not convenient to subsoil the ground, it should be ploughed from 7in. to 9in. deep in the winter and then cross-ploughed, harrowed, disked, and rolled till it is all worked down fine. The ground would, however, be better ploughed 6in. deep and sub-soiled. Maize may be sown any time from September 1 till January, according as the season is early or late.

In the beginning of 1896 (January 24) I sowed some maize under irrigation, and although it was only sown for fodder some matured and some cobs had as many as 500 grains, and the stalks were 6ft. to 8ft. high. In February, 1897, I also sowed some and it gave a very fair return for fodder. I got the best return in both these seasons from seed sown in October. In September, 1897, I sowed maize on a piece of sandy land on which pearl millet had previously been sown, but had succumbed to the hot winds although it had been irrigated and received every attention. Without further irrigation or cultivation the maize was drilled in and grew splendidly, and with ordinary after-cultivation gave a very good return of fodder. In December 16 to 24, 1897, I drilled in about eleven acres of maize on land that had had about 2 tons per acre of hay taken off it; the ground was irrigated, ploughed 6in. deep, and well pulverised; a fertiliser drill was used, and bonedust at the rate of 4cwt. per acre put in with the seed at the rate of 15lbs. per acre, in drills 2ft. 11in. apart. With the exception of about two acres, the crop was very light. On February 1, 1898, I sowed half an acre of maize on land that had just had a crop of potatoes taken off. This gave a return of about 6 tons of ensilage off the half-acre, and it was not a large variety of maize that was sown. This land was irrigated twice while under potatoes, and cultivated several times after the potatoes were taken off; it was ridged and irrigated, and then worked down and the maize sown without any fertiliser. This shows the necessity for the land being well worked for maize. The distance between the rows will depend upon whether the crop is for grain or fodder; 4ft. for grain and 3ft. for fodder being the usual width. The best varieties for fodder are the Horse Tooth and Hogon Spindle, and the Ninety-day variety does very well for corn. It is always advisable to soak the seed in a solution of sulphate of copper (1lb. to 5gals. water), to destroy any spores of smut. To prevent crows or other birds from picking the seed out of the ground, a coating of coal tar is beneficial; half a pint mixed with warm water and poured over the seed is sufficient for 1bush. One inch is the best depth to plant the seed; it may be put in a bit deeper in very sandy soil, and a trifle shallower in stiff soil. Experiments were made a few years ago at Hawkesbury College, New South Wales, with maize to test the value of cultivation, with the following results :—Not cultivated, 35bush. 22lbs. per acre. Cultivated, once, 38bush. 50lbs.; twice, 41bush. 37lbs.; three times, 60bush.

41lbs.; four times, 61bush. 42lbs. Experiments have shown that hilling up invariably results in a loss of from 2bush. to 5bush. per acre. Numerous experiments have also been conducted with suckering (removing the laterals), tasseling, and topping, but each operation shows an actual loss. I have tried several systems of irrigation. The best is to irrigate alternate rows once a fortnight all through the dry weather, always following with the cultivator as soon as the ground is sufficiently dry. Another system is to draw out furrows the distance apart the rows are to be, irrigate, and then drill the seed in the bottom of the furrows, leaving the furrows for irrigation for the whole of the season. This mode can only be practised with success where the ground is sandy and moderately level, and even then, if there is much wind while the maize is young, the plants will be buried too deep. The system of flooding is unsatisfactory in many ways; for, unless the land is very evenly graded, parts will be too dry before the rest is dry enough to cultivate, and in the case of land being at all clayey, it will bake and crack round the roots of the plants, entailing a lot of hard labor and also doing injury to the plants, for the roots are very close to the surface against the plant, and injuring them injures the plant also.

SORE UDDERS.—Mr. Skelton reported that the cows on the settlement were suffering from sores on the udder, generally between the teats and on the back of the udder. A lump appears first, becomes inflamed, and bursts, discharging a quantity of matter. He had been applying twice a day ointment made of 1oz. oxide of zinc and 5ozs. vaseline. He had lately substituted lanoline for vaseline. He also bathed the udder with 1oz. sulphate of zinc in a quart of water daily. After calving the cows were given 1oz. each of powdered gentian and ginger, and later 8ozs. sulphate of magnesia in half a pint of treacle. The sores heal up three or four days after bursting, but break out again two or three weeks later. [The Chief Inspector of Stock suggests dressing twice a day with a mixture made with 5ozs. olive oil and $\frac{1}{2}$ oz. tincture of opium, or half wineglass of carbolic acid in a quart of soft water. The magnesia and treacle may also be necessary to keep the blood cool.—GEN. SEC.]

Kadina, September 1.

Present—Messrs. T. M. Rendell (Chairman), H. Johnson, M. Quinn, J. Ward, and J. W. Taylor (Hon. Sec.).

WEEDS.—Members reported that soursops were not very plentiful in the district. [Take active steps to have it destroyed, then, before it does become a serious trouble.—GEN. SEC.]. Wild mustard was reported to be spreading; also the “native hop” plant, but the latter seemed to be confined to open lands.

Meadows, September 5.

Present—Messrs. J. Catt (Chairman), T. B. Brooks, W. Collins, W. Nicolle, G. T. Griggs, T. Usher, T. Tester, G. Ellis, G. Rice, W. A. Sunman (Hon. Sec.), and several visitors.

SOURSOPS.—Members reported trying to get rid of this weed by ploughing it under, dressing with lime and other means without success. The Hon. Secretary said he had some in his garden, but owing to being continually hoed over the plants were getting very weak.

POTATOES.—A discussion took place on this subject. Mr. Usher, one of the most successful growers of the district, said he obtained the best returns from White Elephants, planted 18in. apart, in rows 30in. apart. He applied 1cwt. super., 1cwt. bonedust, and 1cwt. sifted wood ashes per acre, mixing them together before applying. Kangaroo brand guano gave good results if sown broadcast about two months before planting the potatoes. He put the setts in 4in. deep, and expected to obtain at least a ton of potatoes for every hundred-weight of seed sown.

Golden Grove, September 2.

Present—Messrs. J. R. Smart (Chairman), F. Buder, D. Smyth, and A. A. Harper (Hon. Sec.).

SOURSOPS.—Members reported this weed very prevalent in adjoining districts. The Chairman said the plant was introduced as a garden plant to this district over forty years ago.

APPLE-GROWING.—Some discussion took place on this subject. It was thought that the list of apples suitable for export should be further reduced, and that the Central Bureau should ask the principal growers to name six or more of the best, as those most favored would then receive the attention of those planting apples. [This has been attempted before, but owing to the variation in districts the best variety for one district is not suitable for another, and it was found impossible to reduce the list given in the *Journal of Agriculture* for May, pp. 785-6.—GEN. SEC.]

Gladstone, September 3.

Present—Messrs. J. King, (Chairman), J. Tonkin, J. Shephard, J. H. Rundle, W. A. Warnum, B. Griffiths, J. Greig, J. Brayley, J. H. Sargent, and J. Milne (Hon. Sec.).

DAIRYING.—Mr. Tonkin suggested that the Branch should purchase a bull of a good milking strain for the improvement of the dairy stock of the district. After some discussion it was decided to consider the matter at the next meeting.

MANURES.—Mr. Brayley stated that as far as he could see yet there was no difference between the crop manured with Thomas phosphate and Kangaroo Brand guano. Mr. Rundle considered the former much superior.

WHEAT EXPERIMENTS.—Mr. King tabled several samples of wheat. Tardent's Blue, a variety from Queensland, was just coming into ear and appeared to be a very good wheat. Another was an early variety and very promising. Medea and Alatourka looked well.

STANDARD WEIGHT OF CHAFF.—The question of proposed standard weight of bag of chaff was discussed, and the delegate to Congress instructed to oppose the suggestion for the adoption of a standard legal weight.

Mount Bryan East, August 27.

Present—Messrs. H. Wilkins (Chairman), E. T. Prior, R. Webber, W. Brice, T. Wilks, W. H. Quinn (Hon. Sec.), and one visitor.

BACON-CURING.—The Chairman said he always took care not to disturb the bones in the ham, but removes the bones from the flitches and rolls them. As soon as the bacon is dry he bags it and stores it in the stripping machine, which is kept under a shed. When the machine is required the bacon is removed to the cellar, and he finds it keeps for twelve months without rusting. Mr. Brice salts his bacon in the cask, putting stones in the bottom to keep the bacon out of its brine, and leaves it in the salt for nine days. Mr. Wilks salts on a flag, using saltpetre, a little sugar, salt and pepper; the flitches are kept in salt for a fortnight, hams for three weeks.

EXHIBITS.—The Chairman tabled nice sample of tree lettuce. The Hon. Secretary showed bunch of well-grown White Stone turnips, three, with tops, weighing over 8lbs. These were considered to be extra good for the district.

CHAIRMAN.—Mr. Brice was elected Chairman for ensuing year.

SHEEPWEED.—Mr. Wilks wished to know the best way to get rid of sheepweed (*Lithospermum arvense*).

ANNUAL REPORT.—The Hon. Secretary's report showed that the average attendance during the year was six out of twelve members.

Riverton, August 27.

Present—Messrs. H. A. Davis (Chairman), A. B. Welch, D. Kirk, Dr. Allwork, T. Gravestock, M. Badman, W. J. Andrew, H. A. Hussey (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that the interest in the Bureau had been fairly well maintained during the past year, the average attendance being over seven out of a membership of twelve. Messrs. H. A. Davis and H. A. Hussey were re-elected Chairman and Hon. Secretary respectively for ensuing year.

SOURSOPS.—There are numerous patches of this weed in the district, but no special effort has been made to eradicate them. The following methods have been tried:—Salt kills the weeds but spoils the land. Fresh manure spread thickly on the patches will destroy the plants. Sheep and pigs are fond of them, the latter being effective cleaners, as they root up the bulbs and eat them.

Mount Pleasant, September 16.

Present—Messrs. G. Phillis (Chairman), W. M. Vigar, H. Drogomuller, J. F. Miller, J. Maxwell, P. Miller, sen., H. A. Giles, A. Baker, and H. T. Hull (Hon. Sec.).

SOURSOPS.—This weed is not very prevalent in the district; but it is to be found in several gardens, probably being introduced with nursery plants. Specimens of the plant were tabled and members advised to destroy any they may find on their land.

AGRICULTURAL SHOWS.—Strong exception was taken to suggestion made by Professor Lowrie at the recent Congress, that the present country shows should be done away with, and three large societies substituted. It was decided to further discuss the matter when the full report of the professor's address is available.

Calca, September 10.

Present—Messrs. A. Newbold (Chairman), J. Bowman, F. W. Freeman, A. Plush, R. H. Squire, D. P. Thomas (Hon. Sec.), and six visitors.

SOURSOPS.—Members reported that this weed had been noticed in small patches for some years, but showed no signs of spreading.

RABBITS AND CROWS.—Mr. Newbold read a paper on this subject, to the following effect:—

The rabbits are amongst the most serious of the troubles the farmers, especially on the West Coast, have to contend with. It is well known that they can get up almost any tree or bush with a slight lean, and they climb the netting fences with ease. The nails of their feet are getting long and bent like those of a cat or opossum, and if they continue to improve in this line to anything like the extent they have done during the past twenty years nothing but a galvanized iron fence will be rabbit-proof. For ingenuity in making their burrows they beat everything. There are so many outlets, and the burrows twist and double to such an extent that it is almost useless to attempt to dig them out.

Then the crow is another serious trouble to us. Every farm has about half a dozen old birds hanging about. They live principally upon eggs and chickens, but watch the farmer to see what he is up to. When he starts seeding every crow within ten miles knows of it next

day, and honors him with a visit, which he does not find very acceptable. During the lambing season they go about in large mobs, often headed by an eagle, killing the lambs wholesale, and if they find any weak ewes they torment and worry them until they are too exhausted to protect themselves, when they are soon finished off. When the crops are ripening they are very destructive, and he had seen them clean a strip a chain wide along a fence in very quick time. As for fruit, they eat the grapes and figs as soon as they ripen, and frequently pull off the green fruits for sheer mischief. They are so cunning and wary that it is difficult to poison them. If water is placed where they can get it they will be very chary about touching it. When they can get nothing else they will eat caterpillars, grasshoppers, &c., and are therefore very useful birds. Still he would urge upon the members the necessity for taking united action to get rid of what is undoubtedly the worst of the three nuisances they had to contend with. Wild dogs eat only meat, rabbits eat plants, but the crow eats anything he can get hold of.

WHEAT GRUBS.—Members reported that this pest continues to be very destructive. They appear after the first rains, and eat everything they attack, roots and tops, the surface of the ground being perfectly pulverised. Digging over the affected patches, applying lime and soot, had been tried without success. A member stated that he had placed a cornsack over an affected patch, and in the morning he found a number of the grubs on it. He was satisfied they came above ground at night to feed. Another member reported that a paddock that had been affected for years was ploughed up and left as fallow, and the pest had never appeared there since. [Protect crows, plover, magpies, larks, and other insect-eating birds.—GEN. SEC.]

EXHIBIT.—Mr. Plush tabled sample of rye grass over 5ft. high. It was self-sown, and had not been irrigated.

Koolunga, August 26.

Present—Messrs. T. B. Butcher (Chairman), J. Button, J. Sandow, J. Jones, E. J. Shipway, P. Palmer, W. J. Jose, R. Jackson, R. H. Buchanan, W. T. Cooper, J. Butterfield, G. Pennyfield (Hon. Sec.), and five visitors.

SOURCES.—Members reported this weed to be very prevalent in the district. The application of salt will destroy it, but digging up and removing the bulbs has not been very successful. Members wished to know whether the plant propagated from seeds as well as from the bulbs. [Yes.—GEN. SEC.]

CO-OPERATION.—Mr. Buchanan read a paper on this subject, outlining a scheme which he thought would suit requirements. A general discussion ensued, members generally agreeing with the principles of co-operation.

Cherry Gardens, September 13.

Present—Messrs. E. Wright (Chairman), J. Lewis, C. Lewis, G. Brumby, G. Hicks, J. Choate, R. Gibbins, J. Potter, W. Nicolls, C. Ricks (Hon. Sec.), J. Juers (Clarendon Branch), G. S. Thomson (Dairy Instructor), and twelve visitors.

HILLS CONFERENCE.—Delegates were appointed to attend the second conference of Hills Branches, to be held at Mylor, on October 25. The Hon. Secretary promised to read a paper on "Intense Culture applied to Dairy Farming in the Hills." It was also resolved that the subject of "What Benefits do Members derive from attending these Conferences" should be discussed.

SOURCES.—This weed is spreading very rapidly in the district. The Hon. Secretary said he knew of two instances where it had been brought into orchards here with the soil round fruit trees received from the nurserymen on the plains. Mr. Gibbins said he found the best way to keep them under was to turn the pigs on to the patches. Although they did not completely get rid of the plants, they uprooted and ate very large numbers of the tubers and keep the weed down.

DAIRYING.—Mr. Thomson gave an instructive address on this subject. He had spent the day visiting farms in the district, and had seen as good cows as in any other part of the colony. Altogether their district was very favorably suited for dairying. In such hilly country he would advise them to cross an Ayshire bull with Jersey or Alderney cows. At the conclusion of the lecture a number of questions were answered by Mr. Thompson, who was accorded a vote of thanks for his address.

Mount Compass, September 10.

Present—Messrs. H. Jacobs (Chairman), E. Good, C. S. Hancock, A. J. Hancock, T. Chaplin, R. Peters, F. Slater, J. Youlton, W. Wright, and two visitors.

DISEASE OF PIGS.—Mr. Wright stated he had a pig suffering from some disease. He was taken bad about five weeks since, and lost all power in his legs. He was fed on milk, slop, and pollard, with a little sulphur, and began to recover, but the skin peeled off in thick flakes, and the ears and tail dropped off. Kerosene and neatsfoot oil was applied to soften the skin and keep the flies off. The pig is still weak in the legs, but keeps in good condition otherwise.

MICROBES IN FARMING.—Mr. A. J. Hancock read clipping from *South Australian Register* dealing with the work of bacteria in the soil. Members wished to know where "Alinit" could be obtained. [The preparation known by this name is not obtainable in Australia, and it yet remains to be proved whether it does what its inventor claims for it.—GEN. SEC.]

WOUNDS ON HORSE.—A member wished to know best treatment for wound under the fetlock caused by a rope sawing it. [Wash wounds with soap and water, dry, and then apply weak mixture of carbolic acid or Condy's fluid.—GEN. SEC.]

Stansbury, September 3.

Present—Messrs. Alex. Anderson (Chairman), J. Henderson, Captain Germein, P. Anderson, J. Antonio, G. Brundell, J. Sherriff, C. Faulkner, H. C. Pitt, and G. Sherriff (Hon. Sec.).

GYPSUM.—Some discussion took place on letter from General Secretary re manurial properties of gypsum. Mr. P. Anderson stated that some wheat plots treated with mixture of gypsum and other ingredients he had obtained from the salt lagoons promised better than others treated with various commercial fertilisers.

VINE CUTTINGS.—Mr. P. Anderson stated that he had used a 200-gall. iron tank, cut in half and mounted on scarifier wheels, to burn vine cuttings in. This was drawn between the rows by one horse, a good fire was started, and the vine cuttings burnt as quickly as they could be thrown in. The bottom of the tank is perforated, and the ashes distributed in the vineyard. For a moderate sized vineyard this was the cheapest and best way of disposing of the vine cuttings.

Pine Forest, August 30.

Present—Messrs. J. St. J. Mudge (in chair), J. G. Zilm, A. Mudge, W. Burgess, W. Wurfel, D. F. Kennedy, and R. Barr, jun. (Hon. Sec.).

PLOUGHING MATCHES.—Mr. Kennedy initiated a discussion on ploughing matches v. field trials of ploughs. The trials carried out by the Field Trial Society were more for the benefit of the manufacturess, but ploughing matches would be the means of benefiting and improving the farm hands. With a

liberal prize list, offering either medals or money, and a multiplication of classes, they might induce fifty teamsters to enter. This seemed to have been lost sight of. The holder of the society medal would have no difficulty in getting work on a farm, and a teamster in search of a fresh place would need no better recommendation. Other members agreed; the trials would afford a good opportunity for the makers to show the merits of their implements, which would amply repay them for their trouble and expense.

SOURSOPS.—Mr. Burgess said he had seen a few plants of this weed in a neighbor's garden some years ago. Members were of opinion that it would not become a pest in such a dry district. [Don't give it a chance. Cut up any plants that may appear, or you may have it proved to your sorrow that it *will* thrive in the district.—GEN. SEC.]

COW LOSING CUD.—Mr. Burgess said he had a cow which on two previous occasions had lost her cud, and he had supplied her with half of another cow's, and she had recovered. A few weeks ago she again lost her cud, and neglecting to replace it he lost the animal. The Chairman said he was familiar with this trouble, and found robbing another cow of half its cud or administering a handful of salt effected a cure. Mr. Kennedy said he had heard of this practice before, but looked upon it as a fad or as superstition. When an animal ceased chewing the cud it was only an indication of something wrong—a symptom of disease—and when the complaint was removed nature would renew the cud. [Superstition and tradition are hard to kill. Loss of cud is caused by indigestion or dyspepsia. Cure—give wholesome succulent food, administer 12ozs. epsom salts with 1oz. each gentian, ginger, and carbonate of soda in one quart warm linseed mucilage. Then each morning for a week give 4drs. carbonate soda, 3ozs. ground coriander seeds, and 2ozs. gentian.—GEN. SEC.]

ARBOR DAY.—The first Arbor Day in connection with the Branch was held on August 18th, great interest being taken in the proceedings. It was resolved to make Arbor Day an annual affair in connection with the Branch.

Bute, August 30.

Present—Messrs. W. H. Sharman (Chairman), H. Schroeter, A. Schroeter, D. Green, W. A. Hamdorf, J. Birch, J. H. Barnes, J. J. Chapman, and M. Hall (Hon. Sec.).

SOURSOPS.—Members reported this weed was practically unknown in the district, the only place it has been seen being in one of the member's garden in the earth sent with fruit trees from a nursery.

FIELD TRIALS.—Matters in connection with the Bureau Field Trial Society were discussed. Members favored holding trials of harvesting machinery every other year instead of annually.

BLACK RUST.—This disease is reported to be showing in the wheat crops.

Balaklava, September 10.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, A. Manley, E. Roberts, G. Reid, P. Anderson, A. Hildebrand, and E. M. Sage (Hon. Sec.).

MEMBERSHIP.—Messrs. A. Steinwedel and J. Willmott tendered their resignations, as they were leaving the district. The former has been a member since the formation of the Branch, while Mr. Willmott acted as Hon. Secretary for four years. Votes of thanks were accorded to both gentlemen for their services.

EXPERIMENTAL PLOTS.—Members paid a visit to the public school agromy plots, cultivated by the boys under the supervision of Mr. Willmott. In the plots there are about a dozen varieties each of wheat, oats, and barley, and though too early to say which will turn out best, Steinwedel and the cross between Steinwedel and Ward's Prolific are most promising. The plots hoed during growth and so cleaned of weeds are much better than those uncultivated. There are a number of manured plots, and of these Adelaide Chemical Works super. is most promising, English super. being close up. The plot manured with kainit and Thomas phosphate began to blight off during the warm dry weather in August. Kainit alone has given much better results, and the plot treated with substance obtained from local deposit is nearly as good, and much superior to the unmanured plots. This substance was, however, quite a failure last year. There are also two plots sown with tares. Golden tares are about 2ft. high, very thick, and coming into bloom, while the English is only about 6in. high. The soil at the school plots is about as bad to work as it is possible to find in the district, being a very hard stiff clay. Running down one end of the plots is a channel to carry off the water from the street. Last year the plots by the side of the channel carried a very good crop, but this year on the unmanured plots the portion which last season failed owing to the drought is much the better of the two.

SOURSOPS.—Mr. Anderson reported that this weed had been brought down by the Wakefield river on to his land. It was prevalent all down the river. He was pulling the flowers and marking the patches with the intention of digging them up and removing all the bulbs he could find. Mr Roberts reported the garden at Werocata to be infested, probably from bulbs brought down by floods. It is also reported to be prevalent in other parts of the district, nothing particular being done to prevent it from spreading.

Yankalilla, September 16.

Present—Messrs. J. Cornish (in chair), H. Leverington, J. Butterworth, G. Newbold, J. Mayfield, A. Wood, J. Tonkin, and G. H. MacMillan (Hon. Sec.).

FRUIT PESTS.—Discussion on this subject took place, arising from sale of scale-infested oranges in the district. Members were strongly of opinion that every effort should be made to preserve the local gardens from infection.

SOURSOPS.—Members reported this weed to be scattered over the district, the opinion being expressed that it was introduced as a garden plant. One member stated he had succeeded in keeping it under by burning, another by heavy dressings of salt, while a third member, two years ago, dug out a large patch, carted the bulbs away, and has hoed down any plants as soon as they showed above ground. By this means the weed has been greatly reduced.

Kanmantoo, August 26.

Present—Messrs. T. Hair (Chairman), J. Downing, J. T. Hair, J. Mullins, P. Lewis, F. Lehmann, H. Hair (Hon. Sec.), and one visitor.

SOURSOPS.—This weed has been noticed in the district for several years, and appears to be confined to creeks and damp, low-lying ground, and it is occasionally found in gardens, where, however, it is not allowed to go to seed. Members were agreed that the district in general is not favorable to its spreading so as to become a nuisance.

POTTING BUTTER.—The Chairman asked when was the best time to do this. Mr. Mullins said it would depend upon locality and season. When the grass is at its best and the butter up to standard, then is the best time to pot it. It is important that the potting vessels should be kept airtight. Mr. J. Hair said a cow fed entirely on lucern would not make good butter, and that milk from a young cow would make better butter than that from an old one.

Clarendon, September 15.

Present—Messrs. A. Harper (Chairman), J. Wright, W. A. Morphett, J. Chapman, D. Bilney, W. Spencer, J. Spencer, J. Piggott, J. Juers, D. Thompson, A. L. Morphett (Hon. Sec.), and one visitor.

CONGRESS.—Delegates reported on proceedings of recent Congress, also on visit to Roseworthy College, and expressed their appreciation of the benefits arising from such gatherings.

DAIRYING.—It was decided to ask the Dairy Instructor to give a lecture on dairying.

Angaston, September 10.

Present—Messrs. R. Player (Chairman), E. Thamm, A. Sibley, F. Thorne, A. Friend, W. Sage, J. Vaughan, P. Radford, J. Swann, and S. O. Smith (Hon. Sec.).

CONGRESS.—Mr. Swann reported on proceedings of recent Congress, and it was decided to discuss paper on codlin moth at the next meeting.

PROTECTION OF NATIVE BIRDS.—It was decided to suggest to the Local School Board of Advice that the masters of public schools be asked to impress on the children the necessity for protecting the eggs and nests of our native birds other than those specified as noxious.

PIG-BREEDING AND BACON-CURING.—Mr. Thorne read the following paper on this subject:—

Every farmer and gardener should keep a few pigs to eat up all waste, such as skim milk, waste fruit, and vegetables. It will also pay to grow food for them for instance, peas, barley, mangolds. Do not keep more pigs than you have food for, as it will not pay to buy food for them. It is a bad plan to keep your pigs half starved for five or six months; they should be kept in good condition from the time they are born till you kill them.

The best pig to keep, either for market or for home use, is the Berkshire; they make the best bacon and the nicest shape flitch or middle. If you do not keep the pure breed, let them be very near pure. The sow might have a strain of some other breed, but not the boar. I consider that the farmers and pig-breeders of South Australia have profited more by the importation of the Berkshire pig than by any other animal. If you want a side of bacon a nice even thickness, and with the lean well mixed, or a nice-shaped ham with a small bone or middle, what pig can you get better than the Berkshire? The Poland-China pig is coarse in the flesh and very large in the bone. The Essex is small in the bone, but very fat, with a very little lean mixed in the bacon. The middles, which generally secure the highest price, are very uneven; they fall off so in the flank. In making good sweet bacon much depends on the age of the pig; they should not be more than eight or ten months old, and should weigh when killed from 160lbs. to 200lbs. Pigs should be always killed quietly as possible, especially in the hot weather, to help the curing. If you have two or three or a half dozen pigs together and to kill them the same day, the best way is to have a killing-pen close beside the sty, quietly run one out, take your gun and shoot it behind the ear with a small ball, which will not injure the head for use. As soon as the pig falls, have your knife ready, turn the pig up on its back and stick it. The pig not being excited will bleed well. Choose cool weather for killing; avoid close or thundery weather. Great care should be taken to get the water at the right heat for scalding; it is better to have it too cold than too hot, for a pig over-scalded is very hard to clean. The water should be 150° F.; if the wind is very cold it is a good plan to put a piece of hessian or bran bag over the pig and pour the water over the bag or hessian. Let the pigs hang all night, and cut down when cold, very early in the morning. In summer time get it into salt before the flies are about. If you are making

bacon for the market, cut it into middles, hams, and shoulders; see that the hams are a good shape, leaving the leg bone fairly long so as to be able to dress it for the table; keep the shoulders for the home use; dealers do not care to give the same for shoulders as for middles and hams, and it will not pay to take less where there is a family. For salting I have a tank built of bricks and cement, measuring 2ft. 6in. by 6ft., and 2ft. deep, with a well in the bottom so as to be able to dip out the brine, and a frame made of wood with very fine net wire stretched over it to keep the flies out. It is built in my cellar and keeps at 60° to 70° F. in the hottest weather. It will hold six pigs at the time. I am in favor of dry-salting, for a pig weighing eight to ten score pounds. Use not more than 6lbs. fine salt, 4ozs. saltpetre, 1lb. white sugar. Rub the salt well in, especially on the outside or rind. Bacon should be turned every day for the first four or five days, and should not lie in salt longer than fourteen days; then take it out, lay it on a slanting bench, and with a cloth and cold water wash off every particle of salt; then hang it up for a few days till dry; when dry put it into the smoke-house. This should be from 12ft. to 20ft. from the fireplace, so that the smoke shall be both dry and cool. The best material for smoking is sawdust and a little wood. Do not smoke the bacon too dark, let it be a pale color. Two days with the smoke kept well up is sufficient.

Johnsburg, September 3.

Present—Messrs. F. W. Hombsch (Chairman), T. Thomas, T. A. Thomas, T. Potter, W. James, L. Chalmers, W. McRitchie, G. H. Dunn, T. Johnson (Hon. Sec.), and one visitor.

SOURSOPS.—Members reported that this weed was not known in the district.

STANDARD WEIGHT OF CHAFF.—Discussion took place on this subject, but no decision was arrived at.

Strathalbyn, September 10.

Present—Messrs. M. Rankine (Chairman), B. Smith, W. J. Tucker, D. Gooch, R. Watt, A. Rankine, G. Sissons, H. H. Butler, F. R. Morgan, and J. Cheriton (Hon. Sec.).

MANURING.—This meeting was held at Watalunga, the residence of Mr. E. R. Morgan. Special interest was exhibited in the results of the application of manures, Mr. Morgan furnishing the members with information as to manures used, cultivation, &c. The first paddock visited consisted of twenty acres of Chevalier barley divided into three plots, the whole being sown with $\frac{3}{4}$ bush. of barley to the acre. The plots had been manured with a mixture (in equal quantities) of sulphate of ammonia, kainit, and Sugar Company's No. 2 superphosphates—the first with 1cwt. to the acre, the second with 2cwts., and the third with 2 $\frac{1}{2}$ cwts. to the acre. It was at once evident where the larger quantity of manure had been placed. The next paddock had been divided into four plots, and was sown with $\frac{3}{4}$ bush. of Purple Straw wheat—To plot No. 1 had been applied 1 $\frac{1}{2}$ cwt. Kangaroo Island guano; to plot No. 2, $\frac{3}{4}$ cwt. of Sugar Company's No. 2; to plot No. 3, 1 $\frac{1}{2}$ cwt. of the same; while plot No. 4 had been treated in the same manner as No. 2. It appeared from a pounds, shillings, and pence point of view that the best results would be obtained from the application of the No. 2 manure in lesser quantity. In No. 4 paddock, which was drilled with $\frac{3}{4}$ bush. of barley to the acre, the plots numbered six. Beginning at the highest numbers, which were treated with a mixture of equal quantities of sulphate of ammonia, kainit, and Sugar Company's No. 2, No. 6 plot received 84lbs. to the acre; No. 5, 135lbs. to the acre; No. 4, 105lbs. to the acre; and No. 3 the same as No. 6. In these four plots there was considerable difference in the growth, much in favor of No. 5, but Nos. 4 and 6 showed very little difference from each other; No. 2 received 2cwts. of Kangaroo Island guano to the acre. The cereal in this last plot had not stood out as well as the others, was short but healthy, and it is a question whether given a fair spring fall this plot may not equal the others in yield. No. 1 was

sown with $\frac{3}{4}$ cwt. of No. 2 manure and 2bush. of barley to the acre, and it was quite evident that 2bush. are a great deal too much, and the crop looked somewhat stunted. The log fence paddock, $\frac{3}{4}$ bush. of wheat and $\frac{3}{4}$ cwt. of No. 2 manure applied, was in forward condition. The newly-cleared land in this paddock promises well, and points to the fact that with the application of chemical manure it will pay to clear somewhat poor land. The flock and stud were then examined, some of the ewes being very much admired. Amongst many other items of interest coming under the notice of the visitors was the process of making stack ensilage, a large stack being made from a splendid crop of barley.

SOURSOPS.—Members reported this weed to be prevalent in the district, no special effort having been made to eradicate it. One or two members have used scrub exterminator with, as far as can be seen at present, success.

Paskeville, September 24.

Present—Messrs. H. F. Koch (Chairman), J. C. Price, G. Bamming, A. C. Wehr, A. Goodall, J. Bussenschutt, W. Ayles, G. Meier, F. Bussenschutt, T. Trebilcock, and J. H. Nankervis (Hon. Sec.).

FIELD TRIALS.—Considerable discussion took place on the question of awarding money prizes at the field trials in connection with the Bureau Field Trial Society, and it was decided that in the opinion of this Branch the first prize in all sections should be in money and the second a certificate of merit.

WEEDS.—Mr. Bussenschutt tabled weed growing on his land. Members stated that wild mustard and poppy were spreading very much, and it was decided that the members take united action in trying to keep the same under control.

UNDERGROUND GRUBS.—The Chairman read extract from *Journal of Agriculture and Industry* relative to action taken in Queensland by cane-growers to cope with the cane grub pest. He thought the farmers on the Peninsula should do something similar, and by voluntary contributions raise a fund from which to pay for the destruction of the perfect beetles of the underground grub that has done so much damage to the crops and grass this year. It was resolved that the General Secretary be asked to communicate with all the Peninsula Branches with a view to initiate some scheme in the direction indicated. [This will be done at once, but as the beetles will appear in a very short time every farmer in the affected districts should do his utmost to trap the beetles as soon as they appear. Offer the children a small sum per pint for them, and there will be a very heavy slaughter.—GEN. SEC.]

Clare, September 16.

Present—Messrs W. Kelly (Chairman), W. Kimber, J. Treleaven, J. Radford, W. S. Birks, C. J. McCarthy, H. Miller, and J. T. Hague (Hon. Sec.).

SOURSOPS.—One member reported that some wheat crops were being ruined by this weed. Mr. Kelly stated that it reproduced itself by means of both seeds and bulbs, and that the best way of eradicating it was by constant cultivation in the spring and summer.

EXPORT OF APPLES.—Mr. Lewcock sent sample of Rome Beauty apple. This was highly colored, and had kept well, but was lacking in crispness and flavor. Mr. Kimber stated that he had recently met a large produce merchant from Natal who was visiting the colonies for the purpose of opening up the export trade in various lines of produce. Two lines finding a ready sale there

last year were apples and potatoes. A discussion on packing apples for export ensued. Mr. Birks said he sent apples packed in wheaten chaff to England. They carried well, and realised good prices. Members thought the department should allow apples packed in this material to pass through the depôt, as it was one of the best and cheapest materials for the purpose.

Minlaton, September 24.

Present—Messrs. H. Boundy (in chair), J. H. Ford, R. Higgins, M. Twartz, John Anderson, J. Fletcher, J. McKenzie, A. McKenzie, W. Correll, J. Martin, S. Vanstone, and Joseph Correll (Hon. Sec.).

OATS FOR HAY.—Some discussion took place on the merits of the different varieties of oats for hay. All members considered Cape oats made the best hay, while several agreed that Algerian oats made first-class hay if not cut too green, and that they had the advantage of producing a heavier cut than Cape oats.

AGRICULTURAL CHEMISTRY.—The Minlaton Institute intimated that several works on agricultural chemistry had been purchased for use of subscribers. The Hon. Secretary strongly recommended members to carefully study these volumes, as he found they contained a vast amount of information which would be of great value in the practice of agriculture in South Australia.

MANURES.—Considerable discussion ensued on the use of commercial fertilisers, and it was noted by members generally that throughout the colony the fertilisers in which phosphoric acid was the chief manurial ingredient had invariably given best results. It was again pointed out that by no treatment could gypsum (sulphate of lime) be converted into phosphate of lime, and that when gypsum was sold as such after treatment a fraud was perpetrated by the vendor.

Mylor, September 24.

Present—Messrs. W. Nicholls (Chairman), A. Phipps, F. Rosser, P. Probert, R. S. Mundy, W. H. Hughes, F. G. Wilson, T. Mundy, E. T. Oinn, O. A. Witt, S. Roebuck, and W. G. Clough (Hon. Sec.), and nine visitors.

HILLS CONFERENCE.—Matters in connection with the Conference of Hills Branches to be held on October 25 were dealt with. It was decided to ask the Director to allow of a visit to the Experimental Orchard at Mylor on that occasion.

ONION DISEASE.—The Hon. Secretary reported his onions were dying from some disease, which affected both root and top.

FRUIT TREES.—Mr. Hughes asked reason for some fruit trees making no growth on the north side, while very vigorous on the other sides. Considerable discussion took place, but nothing definite was elicited.

Pyap, September 15.

Present—Messrs. W. Axon (Chairman), T. Smith, A. J. Brocklehurst, G. A. Clarke, E. Robinson, C. Billett, J. Bowes, K. F. Haselius, W. C. Rodgers (Hon. Sec.), and one visitor.

SOURSOPS.—This weed has been introduced to the settlement. It is believed that bulbs were introduced in the soil round lemon trees and sugargums. The plants are dug up as soon as noticed.

EXHIBITS.—Mr. Clarke exhibited well-filled pods of Profusion pea from Bureau seed. Plants of wild geranium were also shown, and considerable discussion took place on indigenous fodders

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Intercolonial Labor Conference.

The following resolutions were carried at the Intercolonial Labor Conference held at the Trades Hall, Adelaide, on September 2nd, 3rd, and 4th, 1898 :—

1. That this Conference affirms the principle of the taxation of unimproved land values for both national and local purposes.

2. That in the opinion of this Conference public education from the elementary schools to the University should be entirely free, books and other requisites included.

3. That this Conference affirms the necessity for an amended Employers' Liability Act, and that it is imperative that the Act should apply to all workers, including seamen.

4. That this Conference affirms the desirability of the establishment of a general weekly half holiday.

5. That in the opinion of this Conference it is absolutely imperative that provision should be made for old-age pensions.

6. That this Conference recommends that the importance of raising a fund to pay trade union organisers be urged upon the various Trades and Labor Councils.

7. That this Conference, representing the labor bodies of Australia, whilst heartily in favor of Australian union, is of opinion that the Commonwealth Draft Bill of 1898 is undemocratic and injurious to the best interests of the people, and that no system of Australian union will be acceptable to the people which does not contain the initiative and the referendum.

8. That in the opinion of this Conference the accommodation for workers on stations and farms should be under State supervision, on similar lines to those adopted by the New Zealand Parliament.

9. That this Conference recommends the Australian labor parties to secure the uniform amendment of the Australian shipping laws on similar lines to the existing shipping laws of New Zealand.

10. That this Conference is of opinion that the time has arrived when more definite and united action should be taken by the Parliamentary labor parties in the several colonies to secure the compulsory recognition by law of the eight hours system in all those trades wherein it has by experience been proved to be practicable.

11. That in the opinion of this Conference it is desirable that the contract system in connection with all Government and municipal work should be abolished.

12. That this Conference recommends the establishment of a minimum wage throughout Australia.

13. That this Conference recognises the urgent necessity for action with regard to the employment of boys, girls, and improvers in various trades and occupations, such employment—without a proper system of apprenticeship—being inimical to the adult workers of the various colonies.

14. That in the opinion of this Conference the Coroners Acts of the various colonies should be amended by making provision for giving a trades union official or person appointed by the relatives or friends of persons who have met their death while following their avocation the right to represent such relatives and friends, and that the same right should be extended to those who may appear to be directly or indirectly responsible for the accident which caused such death.

15. That this Conference is of opinion that the Coroners Acts should, where necessary, be amended in the direction of making better provision for the payment of jurors engaged upon inquests of any kind.

16. *Resolutions of the Conference.*—That this Conference recommends that all resolutions of the Conference affecting the legislation of the colonies be adopted by the Labor Parties of the different colonies as planks in their platforms.

17. *Intercolonial Trades Federation.*—With regard to the subject of intercolonial trades federation a committee appointed to consider the matter reported that they were strongly of opinion that the question of the intercolonial federation of labor was altogether too important to be dealt with at the Conference, so few colonies being represented, and they recommended that a special Conference, consisting of representatives of the workers in Tasmania, West Australia, New South Wales, Queensland, Victoria, and South Australia, should be called (time and place to be fixed), and that in the meantime the various Trades and Labor Councils of Australia be requested to at once prepare a scheme of labor federation for submission to such Conference, the maximum number of delegates from each colony to be three. This report was adopted, and it was resolved that a special Conference be held in Brisbane after the Labor Day celebration in May of next year, that the maximum number of delegates from each colony be three, and that the question of the mode of electing the delegates be left to the various Trades and Labor Councils with a recommendation that the election be by a plebiscite of the members of the affiliated societies. It was further decided that in the event of it proving impracticable to hold the Conference in Brisbane the Adelaide Trades and Labor Council should arrange for the place of meeting.

The Australasian National League.

CONFERENCE AND ANNUAL MEETING.

A Conference of members of the Australasian National League was held at the offices of the League on Friday, 9th of September. There was a large attendance of representatives from country branches and city districts. The President occupied the chair, and the policy of the League was adopted, in the following form :—

1. Taxation.

- (a) Against any additional special taxation on land.
- (b) In favor of a revenue Customs tariff.

2. Unity of Australia.

In favor of intercolonial free trade and Australian federation.

3. Electoral.

(a) Against any reduction in the freehold qualification for electors for the Legislative Council.

(b) In favor of extending the leasehold qualification to lessees owning improvements of the value of £200, and removing the restrictions as to three years' currency and registration.

(c) Against the redistribution of seats on a population basis.

4. Land Settlement.

In favor of liberal legislation to promote agricultural, pastoral, and mining occupation of Crown lands.

5. *Public Expenditure.*

(a) In favor of economy in Government expenditure on non-remunerative departments.

(b) Against the expenditure by the Government of public money without the authority of Parliament.

6. *State Control.*

(a) Against all unnecessary State interference with the management of private industry and enterprise.

(b) Against Government competition with privately-owned enterprise at the cost of the general taxpayer.

It was resolved, on the motion of representatives of the Burra Branch—"That in the selection of parliamentary candidates, wherever practicable, a meeting or meetings of members of each branch in the district be held in a central place to consider who shall be recommended to receive the support of the League." The League further decided, on the motion of the Wasleys Branch—"That an effort be made to secure an alteration in the dates of the general elections from the month of May to March or April."

The Factories Act.

SAFEGUARDING DANGEROUS MACHINERY.

(By the Inspector of Factories.)

One of the most important duties of the inspectors under the Factories Act, 1894, for the administration of which the Government have recently established a separate department, is the safeguarding or giving direction for safeguarding dangerous machinery in factories, and it is often found to be a very nice and difficult point to decide, in the absence of specific legislation, what is and what is not dangerous machinery.

In the ordinary acceptance of the term, nearly all appliances driven by steam must be regarded as more or less dangerous to those coming into direct contact with them, but the object of the provision in the Act was evidently intended to enforce such safeguarding, by fencing, boxing in, or enclosing all dangerous parts, thereby reducing the danger to a minimum without impairing the efficiency or usefulness of the machine.

Some of the objections raised against the proposed innovations in this respect are highly amusing, and are invariably given with the utmost *sang froid*. About the most common is the assurance that the machine has never yet killed anyone, or that the only accidents occasioned by it were caused through the stupidity or gross carelessness of the persons injured. Experience, however, teaches that machines, such as are now used in large manufactories, are not always the harmless toys their owners would have people believe, and the reports of some of the inspectors in the neighboring colonies are interesting in this respect. One of these officials remarks, in a recent report, that while protesting against being put to the expense of making some simple alterations the occupier of a factory proceeded to demonstrate how easy it was to stop the machinery by throwing off a certain belt with his hand, but in doing so was himself thrown violently against the machinery and narrowly escaped with his life.

Another factory proprietor protested that the machine under notice had been running for a number of years and had not hurt anybody, yet within a day or two the hand of an employé was badly crushed in the same machine.

It is needless to say that no further opposition was offered to the suggestions of the inspectors, but it appears almost criminal that it should need the

occurrence of an accident by which some worker is killed, or, perhaps, what is even worse, maimed for life, before necessary precautions are willingly undertaken.

Yet another case, which occurred not 100 miles from Adelaide, and is not altogether without its humorous side.

A gentleman having the management of certain machinery was pointing out the simplicity of its action to a visitor, and in doing so allowed his fervor to carry him half an inch too far, and was made aware of the fact by the loss of just that much of his finger. Moral—Do not point at dangerous machinery; it is not to be trusted.

Among the most dangerous of these useful appliances in common use may be mentioned the circular saw, band saw, planing machine, leather splitters, &c. The first mentioned, and possibly the most dangerous of the lot, cannot well be enclosed in any way without interfering with its usefulness. The danger with this machine lies chiefly in the liability of its free side, which revolves upwards, catching the loose end of a short piece of timber or a splinter of wood, and throwing it with lightning velocity in the face of the person attending it.

With the band saw there is always a certain amount of risk of its breaking and causing damage by the loose ends; but with this saw there is no necessity for having more than the part required for actual use exposed, and when properly boxed in there is very little danger of accident.

Other machines are protected in various ways, chiefly by an adjustable mouthpiece, which permits the article to be dressed to pass through only, and acts as a protection to the hand in case of a slip.

These precautions against accident are highly necessary, not only in the interests of persons immediately engaged in the factories, but also for the protection of others whose business or curiosity may bring them into the vicinity.

It is noteworthy that many of the latest types of machines have protecting guards to all dangerous parts manufactured with them and delivered by the maker as part of the machine.

Superintendent of Public Buildings' Report.

The Superintendent of Public Buildings reports:—The building trade is very brisk at present and good bricklayers are hard to pick up. After the foundations of buildings are finished the laborers, all but the few necessary for the mortar heap and hod work, are discharged; consequently a number of these men are frequently out of employment. The new Government buildings at present under way or almost finished are as follows:—The new Art Gallery, the 100-bed ward for chronic and excited female patients at Parkside Lunatic Asylum, school for 150 children at Edwardstown, South road, with residence attached; school at Richmond, Keswick, for 100 children, with residence attached; post office at Thebarton (the two latter practically finished); police station, Henley Beach; school at Maylands for 500 children, with attached residence; school and residence (thirty-six scholars), Penong (West Coast); school and residence, Johnburgh (fifty children); additional school accommodation at Port Pirie for 150 children; additional schoolroom at Jamestown for agricultural teaching; foundations only of new wards (150 beds) for males, Parkside Lunatic Asylum; rebuilding teacher's residence at Macclesfield (this latter work is being carried out departmentally); painting gangs are at work in Adelaide, Stirling West District, Southern Yorke's Peninsula, Central Yorke's Peninsula, Far Northern District, Northern Areas, and Gumeracha District.

An Important Industry.

WALLAROO SMELTING WORKS.—At these works there are now fourteen smelting furnaces running, together with sixteen calcining kilns, eight mechanical calciners, and two refining furnaces. The ore operated upon is chiefly derived from the Wallaroo mine and the Moonta mine; the class of mineral now being operated upon is copper and iron pyrites. About 300 men are now employed in the smelting and refining works at Port Wallaroo, and the output of copper per month is about 450 tons.

Marble, Freestone, and Slate Trade.

The only person now working a marble quarry in South Australia is Mr. Fred. Herring, of Adelaide, who is working a quarry at Angaston. From these works all the raw material is supplied to the trade in Adelaide for monuments, tombs, headstones, tablets, kerbing for iron railings for cemetery work. Trade is rather dull in these lines. For marble steps and paving, work will be better next month.

FREESTONE QUARRIES.—The principal quarries in full work are the two at Murray Bridge, one at Stirling, one at Teatree Gully, and two at Mitcham.

SLATE QUARRIES.—One at Mintaro, turning out a quantity of flagging for the city corporation. The others are at Willunga.

This industry gives employment to a number of stonecutters, teamsters, and laborers, who are just now working full time.

Work for Women.

A leading labor office manager, of Freeman street, when interviewed last week, reported that there is a good demand for domestic servants from 25 to 30 years of age at good wages. Middle-aged women for generals can be obtained in any number. Experienced housemaids, parlor-maids, and cooks can always command good situations both in town and suburbs. Young girls inexperienced in the duties of housework can be had in any number at low wages.

State Board of Conciliation.

A vacancy on the above board has occurred, caused by the Hon. John H. Howe, M.L.C., ceasing to hold office through effluxion of time.

Regulations for the Establishment of a Government Labor Bureau.

Chief Secretary's Office, Adelaide, September 7th, 1898.

The following regulations for the establishment of a Government Labor Bureau, made by His Excellency the Governor in Council, are published for general information, and are to take effect from the date hereof.

By command,

J. V. O'LOGHLIN, Chief Secretary.

Labor Bureau.

1. A Labor Bureau is hereby established in the department of and under the control and direction of a Minister of the Crown, hereinafter referred to as "the Minister." The Commissioner of Public Works is at present the Minister.

Objects.

2. The objects of the Bureau are to facilitate the finding of employment and the supply of labor.

Extent of Operations.

3. (1) The operations of the Bureau shall not extend to the professional and clerical branches of the Public Service to which the Civil Service Acts apply, but they shall apply to all labor employed in the Public Service.

(2) After the 1st day of January next no labor shall be employed in the Public Service except through the Bureau, or in cases of emergency subsequently approved in writing by the Minister; and no application for such employment shall be considered except registered with the Bureau, but in the meantime any such applications already received may be registered with the Bureau in order of the dates of such receipt.

Superintendent.

4. The Superintendent of Public Buildings shall have charge of the Bureau, and be responsible to the Minister for its proper management, but any other officer may be appointed to the charge of the Bureau in place of the Superintendent of Public Buildings.

Office.

5. The office of the Bureau shall be situated in the city of Adelaide.

Branches and Agents.

6. The Minister may establish such branches and appoint such agents of the Bureau as he shall think proper.

Register of Applicants for Employment.

7. The Bureau shall keep a register of all persons who shall apply to the Bureau for employment.

Residence Requirement.

8. No person shall be entitled to be registered in the register of the Bureau unless he shall first satisfy the officer that he has been resident in South Australia for at least one year immediately prior to his application.

Contents of Register.

9. Every such register shall contain the following particulars with respect to each applicant, viz.:—Name, age, married or single, trade, length of time out of work, number of persons dependent upon exertions, last place of employment, exact place of residence, length of residence in South Australia. The entry of registration of persons registered for the first time to be in black ink, and in case of persons previously registered shall be in red ink.

Particulars of Necessities.

10. No particulars of the necessities of any applicant for employment should be supplied through the Bureau to any person except at the written request of the applicant.

Registration Card.

11. Each applicant shall, on registration, be given a card with his registration number, and every such applicant shall, unless he obtains employment, call or report himself at the office of the Bureau, as shall be required by such card, and in default he will be deemed to have obtained employment, and his name shall be struck off the register.

List of Employers.

12. The Bureau shall keep a list containing the names, addresses, and requirements of all employers applying for labor.

Information to Branches

13. The Bureau shall furnish all branches, when necessary, with a list or information as to persons whose names are on the books of the Bureau as seeking employment, and as to employers applying for labor and the labor they require.

Branch Registers.

14. A register of persons applying for employment and a list of employers applying for labor, similar to the register and list kept by the Bureau, shall be kept at each branch.

Notices of Labor required to be Posted up.

15. Notices shall from time to time be posted up at the office of the Bureau, setting out the trades or callings for which labor is wanted and the number of persons required. Similar notices shall be so posted up at each branch in respect of labor applied for at each such branch.

The names of the employers shall not be posted up, but shall be furnished to applicants on request.

Employers applying for labor shall be allowed to inspect the register, subject to regulation 10.

Local Labor.

16. Where labor can be supplied locally-intending employers and employés may communicate with each other through the local branch.

Agent not to associate himself with either Party.

17. No agent shall associate himself in any way with fixing the wages, hours, or terms of any agreement between the parties, but, if so desired by the parties, shall reduce the agreement to writing and witness it.

Outside Labor.

18. If an agent is unable to supply the labor for which application has been made to him he will communicate by post or telegraph, as the urgency of the case may demand, with the head office, with a view to labor being supplied from elsewhere. In every such case the agent must first satisfy himself that the local supply of labor is inadequate before requesting the demand to be met from a place outside his district.

Selection of Labor to supply (a) Private Employers, (b) Public Works.

19. (a) Where a private employer is not himself present to select the labor he requires, and has requested the Bureau or branch to select it for him, the selection is to be made from the class of labor suitable according to the order of registration of the applicants. Effect may, however, be given to any special written directions of the employer. If any departure is made from the rule of selection according to the order of registration the fact of such departure and the reason therefor are to be immediately recorded in the register by the agent or other person making such departure.

(b) Where labor is required for carrying out any public work, and more than the required number of suitable men offer themselves for employment, lots shall be drawn, the men drawing the highest number to be selected, preference being given to married men supporting families, in proportion to their necessities in this respect.

Railway Passes.

20. Where labor is required at a place distant from the head office or branch, and applicants are being dispatched to such place, and where applicants produce evidence that they are going to some definite employment, but in either case are without means, such applicants may be sent by rail to their destination, and the head office or branch may issue railway passes for the purpose. In no case shall an agent issue a pass beyond a radius of twenty miles from the nearest railway station without the authority of the head office.

Security for Repayment of Railway Fares.

21. Every applicant desiring to obtain a railway pass shall, before the pass is issued to him, sign a form in duplicate, authorising payment of the price of such pass by instalments out of his wages.

The duplicate of such form shall be sent to the employer.

The original may be sent to any branch for the purpose of collection.

Monthly Report.

22. Every agent shall furnish a monthly report of the work of his branch to the head office, such monthly report to reach the head office not later than the morning of the 5th of the month succeeding that to which it relates.

Application for Directions.

23. Agents when in doubt on any matter relating to their duties should at once apply to the head office for directions.

No fees to be taken.

24. No fee or reward, direct or indirect, shall be taken or received for any work done or service rendered by the Bureau, or any branch thereof, or any officer or agent, and any person receiving or taking such fee or reward shall be immediately dismissed and disqualified from employment in the Public Service.

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AND

Industry.

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NOTES AND COMMENTS.

The weather during the past six weeks has completely changed the prospects of the season, and, instead of one of the best harvests we have had, the average will be poor, except in the Lower North and Southern districts, where the early wheats at least will give a fair return. Since the crop reports in this issue were written we have had nice rains over the greater part of the farming areas. This will make a considerable difference to the later crops in the Southern districts which have not suffered too much from the hot winds and dry weather, and will cause the ripening wheat to fill out much better than was expected. The heavy winds and hail accompanying the rain will, however, do much damage. This October has been one of the worst experienced for many years. Over the greater part of the colony hot dry northerly winds, often gales, have predominated. The effect of these has been so marked that in many districts little more than seed and flour will be reaped, while as to the general average, no one seems disposed to make an estimate. Frosts have been more prevalent than usual for October, and considerable damage has resulted in a number of districts.

In the crop reports in the daily papers, the fact that the early crops and those on well prepared land will yield fairly well in spite of the season, while the late crops are almost total failures, is constantly reiterated. In many parts of the North where there may be little grain, a fair cut of hay will be obtained from the early crops. Professor Lowrie's contention that fallowing should be finished before the dry weather commences, even at the cost of a little feed, has been amply justified during the past two seasons. Every year sees more land under fallow, and there is little doubt that we are steadily approaching the time when the greater part of our crops, at least in the more reliable districts, will be put in with the drill on early fallowed land.

In travelling about the country one cannot help noticing the rapid spread of different weeds on cultivated land. It is also noticeable in many cases that some farms are comparatively clean, while those adjoining are dirty. On inquiry it will generally be found that the comparative freedom of the one farm is due to careful cultivation, care in selection and cleaning of the seed, and to the fact that the owner will pull up and destroy any strange weed he finds in or about his land. This will probably be considered by many as a large undertaking, but it will be found comparatively easy to keep a plant from becoming a nuisance, while it is nearly impossible to get rid of such plants once they are allowed to gain a firm footing.

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The sooner that every farmer comes to realise that all seed to be sown must be thoroughly cleaned before sowing the better will it be for the whole farming community. It is true that many of them do recognise the necessity; but their efforts in this direction are greatly nullified by the neglect and carelessness of their neighbors. It should not be difficult to separate the very small seeds of the field poppy from grains of wheat, and yet there are many hundreds of acres of land that have within the past five years been liberally seeded with poppy, which now cannot be eradicated within an ordinary lifetime. Wild mustard, charlock, Spanish radish, sheepweed, wild oats, darnel or drake, dodder, and several other horrible weeds, are being sown broadcast over the colony by careless farmers, who are not only inflicting a great injury upon the present generation, but are promoting serious trouble for those who come after them.

Experiments conducted at the Nebraska Agricultural College show that Early Amber cane gave the heaviest return of any sorghum tried, being closely followed by the White Kaffir corn. The latter, not being so succulent, contains a greater weight of dry matter and less water than the former, but is not, however, of so much value for dairy cows. It was also found that the most profitable time to pasture sorghum is when it has attained its full growth, but before heading. If pastured at this time it will make a re-growth, often affording more forage than the first growth.

Farmers using manures generally use brains as well, but there are some people who do not sufficiently consider things. Suppose phosphatic manures are to be used, it is essential to know exactly how much actual phosphoric acid is contained in it, and also the cost for each "per cent." or "unit" delivered on the land. The lime in combination with the phosphoric acid is not worth carriage for any distance. If basic slag is not pulverised very fine, the phosphoric acid in it will not be dissolved in time for the plant; and the carriage of at least 80lbs. impurities in each 100lbs. of slag would be worthy of consideration if another phosphatic manure contains twice or three times more phosphoric acid. In calculating results, the actual amount of the fertilising ingredient (say phosphoric acid) in the manure should be known, what it cost put on the field, and its residual or unappropriated value for future crops should be estimated. It might pay much better to apply 1 ton per acre of a fertiliser containing a fair quantity of rather insoluble phosphoric acid, at a cost of £3 per ton, than to apply 2cwts. of another kind, even richer, but costing £6 per ton; because in the one case we would get a seven years' supply of phosphate in the soil, whilst the other would only last for a year or two.

Many inquiries have been made concerning water-glass, which has been found to be the best medium for preserving eggs in a fresh condition for as long as nine months. Water-glass is silicate of soda, and is very cheap. It is used for facing soft stone, for manufacture of artificial stone in blocks, and several other purposes. It mixes or is dissolved readily in water. For egg-preservation boil, say, 10galls. water, to kill all germs. When the water is cold, add to it 1gall. of soda silicate, or "water glass," and pour over the eggs until they are immersed. Messrs. A. M. Bickford & Son state that water-glass can be supplied at 9d. per pound for small quantities, or 6d. per pound for larger lots. Wholesale in Europe its cost is about 10s. per hundredweight.

Mr. G. Hollier, of Sunny Creek, Gippsland, on a farm of twenty acres, keeps a herd of eight dairy cows—Shorthorn Ayrshire crosses—which averaged last year over 788galls. per head. From the local creamery he received £104, equal to £13 per cow per annum. Including the profit from pigs fed on the skim milk, after paying for pollard, &c., and from sale of yearling heifers, the total receipts amounted to £120 9s. 3d.

The bulls purchased by the Department of Agriculture have all been sent to their respective stations. The bull intended to be sent to Gawler River Branch has been stationed at Riverton. In connection with this matter it is pertinent to inquire what improvement in our dairy herds can be expected so long as the municipal authorities allow bulls, generally worthless scrubbers but highly-educated fence-breakers, to wander at large along the roads. Many complaints about this evil are made by intelligent dairymen, and that they have ample reason to complain is evidenced by the fact that it is almost impossible to make a day's journey along the roads in any part of the colony where dairying is practised without seeing two or more of these brutes grazing on the roadsides. The remedy for this state of affairs is in the hands of the local governing bodies—otherwise the people concerned—as if the rangers were instructed to impound all bulls found at large the owners would soon get rid of them or keep them at home.

It is a surprising fact that, whilst all people agree with the beneficial practice of castration of domestic stock—a most painful operation—so many persons cry out about the “cruelty” of dehorning of cattle. By merely clipping off the hair around the bosses where the horns on a calf will appear, wetting the skin, and rubbing for a minute with a piece of lunar caustic, the horns will be entirely suppressed with scarcely a sensation of pain. That same animal, if its horns are allowed to grow, will cause no end of pain to other animals by ripping and goring them, and yet “humanitarians” take no note of this. Hornless cattle are very plentiful now in America—especially when intended for transport by train or ship—but some of these have had their horns chipped off when fully grown. That operation is undoubtedly painful: but when the calf is treated as above at three weeks to a month of age the operation is not in the least painful.

The special attention of our readers is directed to the article by Mr. Francis H. Snow on “Co-operative Banks.” Although this was written more from a town standpoint, it is of special interest to producers, and Mr. Snow has promised in a future article to show how, in his opinion, the principles of the scheme could be modified to suit the requirements of the South Australian producing community.

Arizona (California) cultivators have adopted with great success the remedy for “cut worms,” which was recommended in South Australia some years ago by Mr. A. B. Robin, of Nuriootpa. The “worms” are the caterpillars of a species of *Agrotis* (a moth), which hide in the soil during daylight and come forth at night to destroy young vines and other plants. The remedy is to mix 8ozs. Paris green with 30lbs bran in 2galls. water, sweetened with 3lbs. sugar. This makes a stiff paste, which is broken into lumps about the size of a marble and laid about on the infested land.

Several consignments of fresh onions have recently arrived at Port Adelaide from Italy. The recent drought, and consequent scarcity and high prices of onions, has been the cause of these importations, and it is not very probable that the import will continue for long.

SUNFLOWERS.—The large-seeded black "Russian" variety of sunflower is best suited for oil-making, because it contains less pith on the inner side of the husk, which in other varieties retains or absorbs the oil. Sunflower seed contains from 18 to 28 per cent. of oil. An average of about 18 per cent. can be extracted by cold pressure. If heat is employed more oil can be obtained, but it is of inferior quality. To sow an acre about 4lbs. or 5lbs. of seed are required. The plants are generally grown 2½ft. apart each way, but the seeds are dropped at 1ft. apart in rows 2½ft. apart, and thinned out when the plants appear. Misses can be filled up by transplanting. On very rich moist soils the plants can be grown nearer together. About 1gall. of oil can be pressed from 1bush of seed, and a fair average would be 50bush. per acre. In Victoria as much as 100bush. have been taken from an acre. The cake is very fattening.

The sugar industry is probably of greater importance to Queensland than most of our readers imagine. According to official statistics for 1897-8 the total output of sugar was nearly 98,000 tons, valued at £873,900. Of this, 62,417 tons are exported to the other Australian colonies. The area under cane was 98,641 acres—more than *one-fourth* of the whole cultivated area of Queensland. There are in all eighty-one mills and refineries, with machinery and plant valued at £2,067,867.

Through the kindness of the Director of our Botanic Garden, Mr. M. Holtze, the Agricultural Bureau has received about a dozen pounds weight of Florida Velvet bean seed, and this has already been distributed amongst our Branches. This bean has been very greatly over-praised, but still it is a really valuable plant where climate and other conditions are favorable to its growth. Its principal virtue consists in its rank vegetative character, and its habit of collecting nitrogen from the air and storing it in the soil. It is of low value as a fodder plant, and its seeds are not used as food. It will greatly enrich sandy soils when the plant is ploughed under as a green manure; and, in order to secure the greatest benefit, the plant should be left till quite mature, in order that the nitrogen-collecting microbes may enjoy the fullest opportunity to complete their beneficial work.

At this time it is important to remember that seeds should be saved only from the very best examples of each kind required. As a rule, with a few exceptions, it is desirable that no other plants of the same family but different variety should be grown near by. By continuous selection and re-selection every kind of plant can be improved very greatly. Sorghums, maize, millets, and many other plants are extremely liable to become cross-fertilised, and will deteriorate quickly unless the best heads and cobs are selected every year for resowing. Wheats do not readily cross-fertilise, but the best and largest heads should be selected year after year, and be cultivated separately, so as to secure early and prolific crops. Plump, large seeds will always give much better results under similar conditions than can be gained from poor, thin, starved

It is most annoying to the General Secretary of the Agricultural Bureau to receive applications for "another parcel of seed of that splendid melon (or whatever it may be) that you sent me the year before last: it was the best that ever I grew!" Seeds of vegetables, fruits, grasses, cereals, &c., that are new to cultivators here are procured from abroad in very small lots for experimental cultivation by members of the Bureau. They sometimes find the produce to be really excellent, but do not attempt to save a single seed, and, as the seedsmen do not import the particular variety, it is quite possible that the benefit of the experiment may be altogether lost. Every recipient of seeds should be prepared to report upon the results, to save as much seed as possible, if worth saving, and to distribute it to others upon the same conditions. The Bureau does not act as a benevolent institution for the free distribution of seeds, but only introduces new and desirable varieties for experimental purposes.

THE BEEHIVE.

NOTES AND HINTS FOR NOVEMBER.

BY APIS LIGUSTICUS.

Bees require more care during November than any other month in the year, and the reason is the almost total absence of forage. In October, which is the natural swarming season, the flowers of the Cape marigold and of the various fruit trees afford an abundant supply of honey, and bees will then thrive anywhere; but when these plants and trees cease to bloom the bees have to support themselves with the surplus honey they may have stored in the combs. A careful inspection of all hives should now be made, and combs of honey removed from such colonies that can spare them and given to others that have a deficiency. If a colony is found short of honey and bees it should be joined to another; in fact, if necessary to make up one strong colony, it is well to join three or four together. The object now is to have each hive crowded with bees, so that they may be ready to take advantage of the flow of honey that is always expected in December. When two or more colonies are joined together the best queen should be kept caged in the hive for one or two days, so that the strange bees may become used to her. The other queen should be destroyed, or given to any other colony that may require a queen.

It frequently happens that late swarms have not had time to store sufficient honey to carry them through November, and that the other hives in the apiary cannot spare any. In this case feeding must be resorted to. The best food is sugar syrup, made by boiling for a few minutes 4lbs. of sugar with 2qts. of water and half a tablespoonful of vinegar. The object of the vinegar is to prevent crystallisation. This syrup should be well stirred whilst boiling. The food should be given to the bees at night, and placed inside the hive, so as not to attract bees from other hives. Of course honey diluted with water can be used as food, but in that case extreme care must be exercised to prevent robber bees gaining access to the hive. Any kind of feeder will do, but the simplest is a flat tin having a wooden float to prevent the bees from getting drowned in the syrup. A pint of syrup once or twice a week is usually enough for each hive, and will enable the bees to carry on brood-rearing. A little food given regularly in this way has a much more stimulating effect than if a large quantity is administered at one operation.

At this season robbing should be stopped at once, for if allowed to go for a few days the whole apiary will be in an uproar and many colonies destroyed.

It is a good plan to place a piece of glass in front of the entrance to each hive where feeding is going on, in such a way that the bees have to pass round the glass when going in and out of the hive.

Foul brood is more readily detected during an absence of honey than at any other time, and is also much easier to eradicate. Should the disease be observed in any of the hives it ought to be at once treated by one of the methods of cure fully described in the *Journal of Agriculture* for November, 1897.

CO-OPERATIVE BANKS ON THE CONTINENT OF EUROPE.

By FRANCIS H. SNOW.

Co-operative banking, like every other kind of co-operation, has two systems. You may co-operate merely to help yourself, securing by combination with others advantages which personally you are unable to secure—an equivalent direct return for what you have put into an honest concern. Or you may co-operate indeed to help yourself and at the same time help others, and, by your support, to assist in placing them in a position to help themselves. In the first class one has those credit associations which measure their success by the direct benefits obtained in the shape of dividends, as in a joint-stock company, and study above all things large profits for distribution amongst the individual members. To this class belongs the Schultze-Delitsch system of banking. Or you may regard the immediate profit only as a means to an end, only as supplying the power to attain higher objects, and in place of large dividends make it your purpose to provide steady employment, greater independence, and generally a better position for the members of the association. And to this class belong the Raiffeisen banks of Germany and the People's Banks of Italy.

We shall better understand our subject if we first define in some measure what a bank is. Correctly, a bank is an institution which collects money from people who have more than they can employ, and lends it to other people who can employ more than they have; as an institution which manufactures credit and uses its own capital to guarantee the credit it makes; an institution which buys other people's debts, credit, or the present value of their future profits, and pays for them with its own credit or promises to pay.

The People's Banks show us how these sums, the savings of the provident small folk, instead of being lent to the large mortgage, the capitalist bank, and to an unproductive government, can be made to benefit the class from which they are drawn, and themselves to bring forth a harvest of increased plenty and usefulness. Not only this, but the savings of the poor, and the combination of honest persons, has made credit accessible to small folk to whom formerly it was inaccessible. It has democratised, popularised, decentralised credit. In the words of Jules Simon, the great French financier and Minister of France, "The People's Banks have proved the greatest banker of the world is he who disposes of the mite of the poor, and as well as the greatest, he has proved also the safest."

What gives the capitalist his main advantage over the man with no capital? It is not his hard cash, but the credit which that cash commands, and which multiplies its producing power five or ten fold. Take as an instance one of our largest Australian banks. It uses its shareholders' money in capital and reserve of £2,500,000 to guarantee credit it has manufactured in the shape of notes and bills to the extent of £2,000,000, and repayment of other people's money it is using amounting to some £17,000,000. If, however, the poor man is to be made his own capitalist it must be by assuring him of the help of credit, the very last thing that is ordinarily granted to him, but of which he stands in far greater need than the rich. He has no credit because he is poor, and he continues poor because he has no credit. The problem to be solved, in the words of Schultze Delitsch, was "to procure capital without a capital of guarantee; to find means of giving credit to those who have no security to offer in exchange." The People's Bank shows how honesty and labor can be capitalised and become the guarantee of that credit which the capitalist, man or bank, obtains by his hard cash or the shareholders' capital. The problem has been solved by finding moral guarantee, by devising means by the capitalisation of honesty to serve as a pledge or security.

The merit of putting into practical shape the idea of co-operative banking belongs to Germany. The Credit Association of Schultze-Delitsch, commenced in 1852 with a membership of thirty, which during the year rose to 150, and funds amounting to £750; there were in 1895 1,047 of these associations, having a total paid up capital of, in round figures, £6,025,000, a reserve of £175,000, and a total membership of 480,000. In addition to this working capital the associations raised £22,800,000 by loan, and had an entire working capital of £30,670,000. The Raiffeisen loan banks, commenced by Raiffeisen in 1847 with a capital of £300, had grown in number in May, 1893, to 610, with £886,000 outstanding in loans in addition to £153,000 advances in cash credits. They hold only £23,600 in share capital,

£52,000 in reserve, and £1,231,000 in saving deposits. The People's Banks, commenced in Italy, by Signor Luzzatti, at Milan, on May 25th, 1866, with a capital of £28, had grown in 1893 to 730, with a membership of 446,000, being an average of 612 per bank. The collective paid-up capital of 697 banks amounted with reserve to £4,729,000. This capital had attracted £873,000 savings bank deposits, £3,646,000 cash balance and current accounts, and £1,920,000 in long term bonds, and had enabled the banks to lend out in 1893 on acceptances, current accounts, ordinary advances, and otherwise £39,696,000. The systems have spread over Europe, so that when in 1883 the great German champion of co-operation was called home there were said to have been no less than 4,000 associations established in Germany on his rules, comprising something like 1,200,000 members disposing of capital of their own to the amount of more than £10,000,000 and doing business at the rate, so Herr Schmid, of Vienna, calculates, of not less than at the rate of £100,000,000 a year. The same system has spread far beyond the German border. Schmid, of Vienna, calculates the entire number of Schulze-Delitsch banks in 1886 then existing as 4,500 with 1,500,000 members, and attributed to them collectively an annual business of £450,000,000. In Belgium the official returns show for 1895:—Banks have a total membership of 13,749; share capital, £100,000; reserve, £25,400; total business done, £10,503,623. In Switzerland, France, and even to far Japan, the movement has spread and flourished.

The circumstances in which these banks arose both in Germany and Italy, out of distress and poverty, were very similar. To Schulze the idea of co-operation was first suggested by the miseries of trying dearth and famine which swept across Germany during the years immediately preceding the last revolution. He was living in his little native town of Delitz, filling a post corresponding to that of stipendiary magistrate. By this means he was brought in contact with many small folk and learned to understand and appreciate their sufferings. He had visited England, and knew something of its provident societies and the early beginning of co-operation. It occurred to him that the same means applied to the sufferings which he deplored would prove equally effective. His first principle was that no one should obtain a loan who had not himself become a member of the bank and so pledged himself to regular payments up to a certain figure, and moreover that the loan guarantee should be treated not as a matter of charity or favor, but as a matter of business. The two principles of the Schulze-Delitsch banks are unlimited liability of the members and compulsory saving. The value of the shares Schulze advisedly fixed high. The original figure was, I believe, £30. Of course it was provided that such a sum need not be paid down at once, rather it was assumed that it would be made by instalments, which might be very small. This principle necessarily committed the newly-joined member to a long course of saving. With the help of the capital thus in course of formation, of savings bank and other deposits the banks are in a position to raise all the money they require. The loan granted to their members may be large or small, and the bank practically asks no question as to the object of the loan or the character of the borrower. The loan must, however, be for a short term. Practically any kind of security is taken—mortgages, pledges, sureties, or bills. The loaning is done freely, but not necessarily cheaply. The charge at the outset varied from 12 to 14 per cent., and not long ago it stood generally at 8 per cent., though ostensibly only at 6 per cent., the additional 2 per cent. being tacked on the disguise of a commission of $\frac{1}{2}$ per cent. reckoned for three months. The purpose of the Schulze-Delitsch banks as indicated was rather compulsory saving and high dividends on the share capital. I do not dwell upon their methods, as the principle of unlimited liability is scarcely acceptable in Australia.

The Raffeisen system applies more particularly to an agricultural community. Each association is confined to one particular district or township, the membership being selected with great care and discrimination. Caution and security are the two guiding principles of action. All banking in the ordinary sense of the word is strictly forbidden. The associations are purely loan associations. They borrow on the credit of the association, and the members derive no benefit except the privilege of borrowing. The shares are as small as possible, generally from 10s. to 15s., payable by instalments, and there are no dividends, any profit being carried to a reserve fund. The whole fabric is built on the lines of pure co-operation, safety, caution, and stability. The rules and regulations are also framed as rather to check borrowing than to encourage it. Money is found for each member who needs it, but in every instance he must first make out his case, the specific object for which it is required must be stated, and once the money is granted it must be conscientiously applied to that specific object. Once every three months the council of supervision meets for the special object of reviewing the position of debtors and their sureties and considering the employment which is given to the loan money. Should the surety be found to have seriously deteriorated in solvency or trustworthiness a fresh surety is at once called for, or the debtor not being found to have applied the money for which it was granted, the loan is at once called in at four weeks' notice. On the question of repayment of interest and principal the bank is equally inexorable. They must be paid to the very day. The principal for all loans running any length of time is made payable in equal instalments, and on any point rather will the bank give way than on that of prompt and punctual repayments. Security in these Raffeisen banks is so well established

that the Rhine-land law courts actually allow trust money to be paid into them on deposit, and in the years of the great wars, 1866-1870, when deposits were withdrawn wholesale from other banks, they were actually pressed on the Raffeisen banks for safe keeping though it should be without any interest at all. Whereas the Schultze-Delitzsch bank is established to enforce saving and to secure a high rate of interest upon its share capital, the purpose of the Raffeisen bank is the lending of money at the lowest possible rate of interest to its members. Borrowing as it does upon the joint and several liability of the members as an association, it gives to them individually for specific purposes the money it has so obtained, without profit to the bank and at the lowest possible rate which will cover its expenses. It were a long story to tell what has been done by these Raffeisen banks in the agricultural districts of Germany. Some such association as this is what is required by our farmers, and especially upon those having credit selections or perpetual leases, for the proper working of which capital is required.

From an Australian point of view no form of co-operative credit banking commands a greater amount of interest than that which is found in Italy. It is regarding the People's Banks of Italy that I can speak from fuller personal knowledge. I had the pleasure of visiting the People's Banks of Genoa, Milan, and Bologna, and personally meeting Signor Luzatti and Signor Sarni, whose names are intimately connected with the success of the two latter. It is upon the People's Banks of Italy that are modelled the co-operative banks of Switzerland and France, and now in England under the advocacy of Mr. Wolff.

The Bank of Milan has become one of the marvels of Italy. It employs in addition to 130 to 140 unpaid officers nearly 100 clerks. The number of its members stood at the beginning of the last year at 17,860. Its paid-up capital amounted at the same time to £360,000, consisting of 171,966 shares, with a reserve fund of £179,000, in all £515,896 sterling. In addition to £3,112,700 of ordinary deposits, the bank held £1,290,000 in savings; it lent out in the course of the year £3,857,716 on acceptances and £2,765,800 in other ways. In all, with its own business and that with 320 other People's Banks and various correspondents, it had a total turnover in 1895 of £59,688,269, with a net profit of £50,811, which enabled it to pay a dividend of 6-40 lire (5s. 4d.) on the 50-lire share (£2 1s. 8d.). Amongst co-operators the Bank of Milan is not regarded as a model bank altogether, though in point of strength and wealth it has proved most successful. In the opinion of some it has become with its increased prosperity almost too capitalistic. Though its lendings and its benefits are confined strictly to its members, a large number of persons and firms not members have credit accounts with it.

The Banca Popolare di Bologna is regarded as one of the best specimens of co-operative banking in Italy. Commenced in 1866 with a capital of £4,660 and a reserve of £11 10s., its capital has grown in thirty years to £52,500, its reserve to £53,800, its turnover from £29,166 to £1,592,350, and its membership from 2,000 in 1872 to 4,971 in 1895, whilst its annual profits have correspondingly increased from £228 to £6,250. Its shares, which were issued at £2 10s., are now valued at £1 13s. 4d. As S. Sarni informed me, no further shares are issued. When a member ceases to employ the funds of the bank and others wish to join, an arrangement is made by which the share of the non-business contributing member is transferred. This bank has shown itself largely given to good works, not only in the way of loans of honor, but also in its contribution to useful and charitable forms of enterprise, besides spending freely on useful objects, and in the interests of vinegrowers and husbandmen. As showing the consideration given to the funds of the friendly societies from the rates of interest as displayed in the banking chamber, I copied the following interest rates:—

- 2 per cent., daily balance.
- 3 per cent., small savings in deposits from 1 lire to 150 lire.
- 2½ per cent., large savings.
- 3½ per cent., twelve months.
- 6 per cent. to friendly societies.

Discount Rates.

- Three months, 4½ per cent.
- Six months, 5½ per cent.
- Loans, agricultural, six months, and current accounts, 5½ per cent.

Is business of these co-operative banks safe? "Not a penny has ever been lost either to creditors or depositors," so the president of the great Raffeisen Union made his boast after an experience of forty-seven years, and speaking on behalf of a union of associated banks. "Our losses have been altogether trifling. In the times of economic crisis less than those of other banks," states Professor Concine on behalf of the People's Banks of Italy. To the system of banking which gives to the People's Banks a full portfolio of bills available at any time for re-discount, much of the success of the system and the smallness of its losses is ascribed. It is this which in severe commercial crises when non-co-operative institutions have tumbled to pieces crash after crash, as in the recent bank crises in Italy, has enabled co-operative banks to stand firm as a rock. Runs on co-operative banks are practically unknown because everybody is aware of the position of the bank, and nobody is likely needlessly to make a run upon himself. It is a cardinal principle with all to court publicity in every respect and to the fullest extent. Every bank publishes monthly a statement of its position,

The whole of these returns from all the people's banks are now published in a monthly gazette issued in Rome by a central association.

Who are the members of these banks? They have been classified as follows:—Small agriculturists, gardeners, gamekeepers, fishermen, 31·5 per cent.; small manufacturers and independent artisans, 26 per cent.; dealers, 8·7 per cent.; renters, and persons of no special trade, 7·4 per cent.; doctors, druggists, teachers, priests, employés, 6 per cent.; operatives, 5·6 per cent.; carters, woodcutters, &c., 4·8 per cent.; business clerks, postmen, telegraph employés, post office clerks, servants, 3·9 per cent.; manufacturers, landowners, 3·1 per cent.; day laborers, 3 per cent.

How are the banks founded? At first a small nucleus of intending members in the town or village is formed who meet and adopt the rules. The proposed rules are in Italy forwarded to what we should term the town council, and if approved by them the bank may at once commence its operations. These rules have for years been practically settled, so that any new bank opening adopts the rules of one of the older banks, or applies to the Central Association of People's Banks for the necessary information and guidance. After the nucleus of the bank is formed and the rules settled, each intending new member must be recommended by two other members and approved by the general committee. It is not the practice that the character of intending members should be too searchingly inquired into, but the scrutiny is careful. Since each loan and the security upon which it is granted is scanned upon its own merits, the acceptance of members of indifferent character or position is felt to rather affect the standing of the bank than its solvency. As it attracts deposits largely by the character of its members, care in their selection is invariably exercised. The number of members is usually without limit, but their holding is defined and a maximum stated. As a rule the limit which can be held by any one member is usually not more than 100, five or ten being the more general holding. The share value varies from 5s. to £5, according to the class from which the membership is drawn, £2 per share being the usual figure. In addition to payment for his share each member has to pay an entrance fee, the amount of which is placed to the reserve fund. Added to this in the prosperous banks the shares rise in issue value in proportion with the growing reserve by 25 per cent. to even up to 100 per cent. Thus in the bank at Bologna shares originally issued at 60 lire are now issued at 112. The amount of these shares is payable by instalments, but they must be paid within ten months at the longest. The voting is never according to the holding, but is on the principle of one man one vote. Fully democratic self-government of the members by the members and for the members is held to be indispensable, so that the wealthier members may obtain no undue share of the control. The authority of the bank is vested in the general meeting of the members. As an executive the members elect at their annual meeting what is termed a council or general committee. This body, whose services are entirely gratuitous, wield, next to the general meeting, supreme authority. The number of its members varies according to the size of the bank. It may be from seven in the smaller banks to 130 as in the great Bank of Milan, but is usually from fifteen to forty. All loans must be approved by this committee. The paid officers of the bank have no power whatever to grant loans or to pledge in any way the credit of the bank. Their duties are purely executive. The committee prepare themselves for their active work of drawing up independently of any actual application a table kept in readiness, but always strictly secret, which shows what amount each member of the bank is in their opinion good for. This table is carefully revised from time to time, and should the estimate fixed in it for any member decline whilst the loan is current with him or with anyone else for whom he acts as surety the debtor is at once called upon to make up the difference. From its own number the general committee elects from three to five as an executive. Upon them devolves the daily supervision of the affairs of the bank. As a rule they take the duty in turns each for a week at a time, and after so much expenditure of time and labor are generally allowed to retire at the close of a year. A peculiar feature of the management of these People's Banks is a small board of three termed "*Probi viri*" (trustworthy men), to whom an appeal may be made on any point whatever arising in the administration of the bank, and whose judgment is final. A candidate refused admission, a member refused credit, a member sentenced to expulsion, whatever the question may be, an appeal lies to them, and their jurisdiction has been found to be a rock of strength in maintaining harmony, strict discipline, and smooth flow of business. In this way the bank is managed by the members for the members. No loan or any benefit of the bank is granted except to members. Others may have credit accounts receiving interest upon their daily balances, or may place money on deposit with it at interest for fixed terms, but they cannot obtain any other benefit. The loans to members are made largely by way of discount of P/N's, acceptances, or bills. The approved limit of these is three months, but the bank will permit renewal for three months more. It prefers short terms as also small amounts, so as to keep money constantly in hand and rolling. Overdrafts are granted but to a small extent, the banks not encouraging this form of advance even though well secured.

As with the Raiffeisen banks in Germany, the People's Banks of Italy do not seek to make profit for their members, the dividends being limited in many to 5 per cent., the great aim

being cheap money, cheap loans for the members, and coupled with small expenses through the large amount of gratuitous service in the conduct of its affairs. With the large funds at their disposal from savings bank and other deposits, balances in current accounts, the banks at Milan, Bologna, and others do not require to rediscount, but in the smaller ones this is freely done. The people's banks are regarded by the joint-stock banks and savings banks not as competitors, but as serviceable allies, opening to them a wide additional field of business which they cannot themselves cultivate.

Is there room for People's Banks in Australia? I think there is. We are told that our Savings Bank cannot profitably employ its funds, the savings of the industrial folk. Our friendly societies have difficulty in finding investment for their funds. Our capitalist banks make a favor of taking loans at interest from their customers and refuse them from outsiders. Granted that the People's Banks, if established, can secure the confidence of the public, more than sufficient funds will be at their disposal. Amongst the members of our friendly societies, amongst the members of this co-operative society, amongst the numbers of small tradesmen and working men and small agriculturists and market gardeners, willing workers beyond the limit of actual want and employment, who see their opportunity, who have the ability but want the means, have we not the same industrious *clientele*, who, if funds were placed at their disposal, could make them equally reproductive as the class for whom the People's Banks of Germany and Italy have done so much. May we not hope that the fabric will bear transplanting and find here in Australia a virgin and congenial soil in which it may spread and grow; a fabric which, in the words of M. Durand, "may well be regarded as the envy of Europe, which as a financial power ranks side by side with the Rothschilds, which does a full third of its own country's banking, and which, through its thousands of channels, dispenses annually a stream of millions to the very points where it is needed."

POULTRY NOTES.

BY D. F. LAURIE.

Written for the "Journal of Agriculture and Industry."

Incubators, &c.

Several breeders are experiencing the usual difficulty generally present when the weather is dry, as regards chickens dying in the shell through inability to force their way through the inner skin and shell. Although in numerous cases this is due to the excessive evaporation of the water contained in the egg, thus causing the skin to become dry, tough, and sticky, still in many other cases the results of injudicious breeding and feeding make themselves known to the observant breeder. Constant in-breeding and breeding from immature stock, as well as breeding from diseased stock, all tend to the production of weakly embryos, most of which have not sufficient vitality to last out the term of incubation, even under the most favorable circumstances; others which may hatch are miserable weaklings and useless for any purpose. To those who have not yet grasped the significance of previous contributions I would again point out that it is of no use going in for poultry-raising, nor will my remarks properly apply, unless in the first case only healthy, vigorous birds are kept, and, secondly, for each purpose only the most approved pure breeds and their crosses are bred from. Where natural incubation is adopted be sure to have all nests on the ground; then, if the earth surrounding the nest is dry, pour warm water round the nest so that it may soak into the ground under the nest; the heat of the hen's body will cause a slight vapour to ascend, and in addition to lessening to a considerable extent the evaporation of the aqueous contents of the egg will also have the good effect of rendering the egg shell more easily broken by the chick. I do not approve of damping the eggs when either under a sitting bird or in an incubator; the warmth of both bird or egg-drawer causes rapid evaporation, and consequent cooling, and even chilling of the egg. This practice, although often recommended by inexperienced persons, is the cause of many vexatious losses. The practice of immersing eggs in blood-warm, clean water for a few minutes is all right if each egg is care-

fully dried with a clean, soft cloth before returning to nest or incubator. It is a risky operation to assist chicks out of the shell; still in many cases assistance is justifiable, but in all cases it is well to have a small basin of warm water at hand. First carefully remove the shell near the chick's beak, so that it can gain sufficient air. If no results follow, carefully, and a little at a time, remove the shell, holding the egg partly in the water. In many cases portions of the shell or skin will, through lack of moisture, stick to the chick and hold it prisoner; the water sets it free. Proceed cautiously or undue bleeding will be caused; this may end in death, or at any rate will weaken the chick. I find it a good plan to tap the egg shell sharply with the finger nail, so as to cause a circular fracture where the chick is endeavoring to make its exit. The bird generally does the rest. Sometimes chicks hatch before their time, and in such cases it will be found that the yolk is not completely absorbed, and the chick never makes a fine bird. When the temperature of an incubator is too high, as is often the case, such results are common. I have always advocated an average temperature of 101° . Should 102° on the one side, on even less than 100° , be occasionally indicated the results will be all right. Early writers on artificial incubation recommended as high a temperature as 106° as long as the bottom of the eggs remained cool. More recent writers recommend 104° for the first two weeks and 101° for the remainder of the period. It will readily be understood that as the embryo grows it will have heat of its own, and therefore a less degree of heat is required to be supplied to produce the required temperature. This may easily be proven by starting a drawer full of eggs (in a double-drawer machine) and then, after a week, filling the other drawer with fresh eggs. After five or six days the first lot of eggs will feel much hotter than the later lot, and if the two thermometers are laid on the eggs the one will register a higher temperature than the other. To prove that the machine is heating both drawers equally change them, and the result will be as before. I prefer a machine with either one large drawer, or, if several drawers are required, the bottoms must be framed separately and fitted with mechanism of some sort for raising or lowering the level of the eggs. Then it will be necessary to have the thermometer hole slotted and provided with a shield in front, so that it may move freely with the drawer, or a breakage will result. Finally, those machines with flat-bottomed tanks and flat egg drawers cannot, under any circumstances, diffuse an equal degree of heat over all the eggs. It is very evident that the centre egg receives rays of heat from every point of the heating surface of the tank. The egg at the sides, front, or back only receives rays from a limited portion; other eggs receive more or less. This contention can be proved by a diagram and very extensive, minute, and accurate measurements. It can also be practically demonstrated by using a number of long glass thermometers inserted all round the machine. As the centre of the egg drawer is left it will be found that at regular distances therefrom the thermometers will register the same. Gradually the temperature diminishes as the sides (and front or back) of the drawer are reached. An officer of our department, a very able engineer, kindly checked a diagram some ten years ago for me, and the necessary curvature to tank and drawer which I had adopted from the practical tests was found to agree closely with the theoretical test. All first-class makers now adopt this feature in England, America, and Australia. On the other hand, many experienced breeders have had good results so far, and I have had the pleasure of seeing several fine healthy mobs of chickens in a forward condition.

There is a great demand for both eggs and stock of that grand breed, the Minorca, and in visiting the yards of Messrs. Cope, Eldridge, Miers, Rounsevell, and other large breeders I saw many good ones of various ages. Nearly everyone I meet talks Minorca. It is the same in Victoria and New South

Wales. My own 150 egg incubator is chock full of Minorca eggs, only they are so large that the drawer does not hold more than 140. Indian Runner ducks are also very popular, and are being extensively bred. I am pleased to note that Mr. G. H. Dean has secured a dozen first-class birds, some imported, from Mrs. Cadell, of New South Wales; he has now five strains. There are more Dorking chickens, yes, more scores of them, than ever there were single specimens in the history of the colony. I understand the principal breeders—Messrs. Thyer, the Boys' Reformatory, and Hair & Son—have had good luck Indian Games are maintaining their good reputation, and what with Langshans, Orpingtons, and Leghorns we shall see a gradual but not slow all-round improvement of farm stock.

As regards the Orpington, Mr. W. H. Martin, of North Unley, writes me—“When you lectured on poultry at the Exhibition you remarked that Buff Orpingtons were the rage in England. I have thought you might like to know result of cross from this breed as a laying strain. I have a chick hatched July 8, laid her first egg October 22, second egg 23rd. I consider this good for a table bird, and my three pure pullets, hatched December 11, 1897, laid 219 eggs to October 23. One pullet sat six weeks, and another has been sitting three weeks. This is a proper and genuine record.” I have not yet seen Mr. Martin's birds. A bird which starts laying at fifteen weeks and one day certainly loses no time in making money. This record was equalled last season by a Silver-laced Wyandotte pullet bred by Mr. Osborn at Mitcham. I saw a Minorca pullet not yet four months old and laying; this was at Mount Barker. Of course this is all very well where eggs alone are concerned, but where size for breeding from to keep up the size of the progeny is the point precocious pullets must be watched, fed sparingly, and moved from yard to yard so as to retard laying till well grown. Early laying to a great extent stops growth.

That fruit-growing and poultry-rearing may be combined has often been demonstrated. Of course discrimination must be exercised. It would not do to have turkeys or the flying (light) breeds of fowls in an orchard containing soft fruits. Ducks and non-flying breeds would do well, and would give a treble return, firstly in the shape of eggs and birds for sale, secondly by destroying all noxious insects, &c., and last, but not least, the valuable manure they would spread about. When lecturing I called attention to the fact that in the hop counties in England it is the rule to have many mobs of young chicks for the purpose of destroying grubs, insects, &c. As they reach an age when their scratching might do harm they are removed, and replaced by younger ones. Mr. W. Cook, of Orpington fame, gives particulars of an old cherry garden which was brought from worn-out barrenness into thriving prosperity by means of a large mob of poultry. At Pakenham, in Victoria, Messrs. Grant Bros. keep numerous flocks of poultry about their up-to-date orchard, and find that this answers well. The whole matter only requires a little thought and management.

Fowl Ticks.

The Minister of Agriculture for Victoria recently approved regulations with respect to poultry entering Victoria from this colony as a means of preventing the introduction of the poultry tick (*Argas reflexus*, vel *Americanus*). I now notice that this pest has been discovered at Mildura. I have mentioned that nearly all the poultry-houses in Victoria are constructed of timber; many of them are very elaborate and ornamental. Should this scourge obtain a footing there the cost of destroying and rebuilding with iron would mean thousands of pounds, and ruin to many. Our breeders are far too careless as regards vermin in general and tick in particular. It is of no avail what care is taken otherwise if vermin are permitted to infest the premises and drain the life blood of

the birds. It would cost a few thousands of pounds to deal with this question in the vicinity of Adelaide alone. Paling fences and houses offer excellent harbor for vermin, and when they are well under the palings it is almost impossible to reach them with insecticides. When these pests attach themselves to the birds they may be destroyed by dipping the bird, all but its head, in Cooper's sheep dip, or in a strong solution of Jeye's compound, Little's phenyle, Whalley's disinfectant, or Quibell's compound. Kerosine and oil in equal parts, applied with a rag, is generally effective, but the process is slow. Where the houses are built of iron solely, a bundle of grass and dry leaves may be put in the house and set on fire; when the iron gets red hot tick and eggs of lice, &c., will be satisfactorily dealt with. All woodwork should be frequently soaked in any of the before-mentioned insecticides. Chicks running with hens should be frequently examined, as if infested with vermin they soon die. The lice are generally greyish in color, and congregate on the head as well as the body. One part kerosine and two parts oil will speedily kill them.

What are generally called warts (in reality chicken pox) may be cured by an application of No. 2 carbolic acid one part, olive oil ten parts; apply with the finger, and use caution that none gets in the birds' eyes, as it is painful. Where obtainable gather stinging nettles and boil them, and after cutting up mix the whole, including the fluid, with the soft food. This is invaluable for ducklings and goslings, and is much liked by all birds, also cats and puppies, and is very cooling to the system.

Young Fowls.

Separate the sexes as soon as cockerels can be distinguished from pullets; each will grow better and the young cockerels will make better table birds. Where high-class birds are bred, and it is desired to improve the stock and raise the standard, reject all faulty, weedy birds; they are not worth the trouble of rearing. Keep good ones only: they alone will be profitable. In conversation with a gentleman who has bred sheep, horses, cattle, and dogs, and poultry, for thirty or more years, he remarked that he had always found that high-class stock, in addition to satisfying the eye, was far the most profitable to keep; this is the universal finding. The winning table birds at the great dairy show in England have often been bred from noted winners. If farmers and others could only be induced to breed such birds, and enter them for competition, we should see the table poultry classes the most attractive features of town and country shows. Most of those who have the energy to keep good breeds have generally too little space at command to rear table birds; with others the sordid pelf in the shape of prize money outweighs all other considerations, and they will not exhibit unless sure of a win.

Crowing.

Mr. Harrison Weir has been writing to an English paper *re* crowing cocks, and suggests an apparatus to fit on the bird's mandibles so that he cannot open them sufficiently to crow. There is little objection to crowing in the daytime, but at night it is a different matter. If a fine wire or a piece of string be stretched along the perch at night, so that when the cock raises his head to crow he will touch it, he will utter indignant protests and soon desists; this is at any rate worth trying where a case of sickness is in the house.

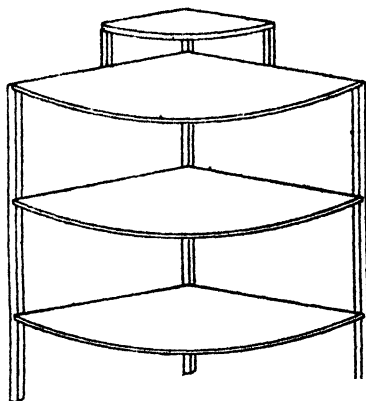
Short Notes.

Poultry of all sorts have been scarce this season, and it is to be hoped that the demand has resulted in the slaughter of the greater portion of the atrocious mongrels and weeds one so commonly sees.

We are already getting a taste of summer weather. Keep all drinking water carefully shaded, and see that it is clean and fresh. Do not allow any food to remain in the yards; it will become sour and cause various ailments. Green food should be provided daily. Keep yards and houses scrupulously clean. Never let a dead bird lie about; if the birds peck at a putrid carcass they generally die of chicken cholera.

HOUSEHOLD CONVENIENCES.

A neat corner "whatnot" can easily be made with three pieces of 2in. x 2in. deal and some boards knocked out of packing cases, thus:—



A little paint or stain will complete this handy little piece of furniture.

HOUSEHOLD HINTS.

ANTIDOTE FOR MORPHIA, LAUDANUM, &c.—It is stated that an American doctor—Dr. Moor—has discovered an effective antidote for morphia and other narcotic poisons, and proved its beneficial effects, in the presence of twelve other physicians, by first swallowing three grains of morphine, and immediately thereafter swallowed a solution of 6grs. of permanganate of potash in 4ozs. of water. The morphine, it is said, had not the slightest effect upon him. Permanganate of potash is commonly used as a disinfectant and, being very cheap, should be found in every home.

FOR BURNS AND SCALDS.—Prepare now, and keep always ready for accidents, a mixture of equal parts of linseed oil and limewater, to be applied thickly on a piece of cloth or flannel to scalds or burns. Limewater is simply the clear water in which quicklime has been stirred and left to settle.

PEACH CONSERVE.—Select choice freestone peaches; peel, halve, and stone them. For each pound of prepared fruit have 12ozs. of crystal sugar; make of this a syrup, allowing 1pt. soft water to each 3lbs. sugar. Crack one-fourth of the pips, crush or slice the kernels thinly, place in a muslin bag, and boil with the syrup. When this is thick skim well, put in the peaches and boil gently till they are clear, but not soft. If necessary, move them gently to prevent sticking. When cooked enough, remove very carefully from the syrup, which should be drained back into the pan. Boil the syrup again till very thick, skim it again, then add the fruit once more, boil six to ten minutes, and place in jars and *at once* fasten down. This is delicious, and will keep good for years if the air is kept excluded.

PROHIBITION OF STOCK FROM COUNTRY IN WHICH THE CATTLE TICK (*IXODES BOVIS*) IS PREVALENT.

The Victorian Government have prohibited the introduction of cattle, horses, sheep, and dogs from all country north of the prohibitory line crossing the Northern Territory from the Queensland boundary to the West Australian boundary.

Introduction of Queensland Cattle via South Australia.

Regulations have been issued controlling the introduction of Queensland horses, cattle, sheep, and dogs through South Australia from all that part of Queensland south and west of the published prohibitory lines.

Owners desiring to introduce stock must give not less than forty-eight hours' notice in writing to the Victorian inspector at the appointed crossing-place. If for stabled horses or dogs by sea, the notice must be given to the inspector at Port Melbourne.

The owner of stock, before introducing the same, must produce to the Victorian inspector of stock at the crossing-places a certificate from the South Australian inspector on the entry of such stock into South Australia, in accordance with a schedule form which shall be indorsed under the hand of some one or more South Australian district inspectors of stock along the route travelled by such stock.

In the case of stabled horses or of dogs a somewhat similar declaration and certificate from the South Australian inspector is also required.

Besides these certificates, declarations are required in regard to stock to show they have not been for the preceding six months infested with, or in contact direct or indirect with stock infected with tick fever, and have during that period been in country south of the prohibited lines, and also that the whole of such stock have been in South Australian territory for not less than three calendar months.

Declarations as to stabled horses and dogs are required also for the term of six months, but it is enough for such animals to have been in South Australia for one calendar month. Where stabled horses and dogs are introduced by sea, they can only be carried by vessels which have not traded at any port or place in the Northern Territory or in the colony of Queensland, which must be stated in the declaration. Before the introduction of stabled horses and dogs they must be thoroughly disinfected to the satisfaction of the Victorian inspector, so as to effectually exterminate all ticks.

If the Victorian inspector is satisfied all the certificates are proper, and that the animals have neither tick nor tick fever, he may permit of their introduction at Serviceton, Penola, Melbourne, or such other place as may be appointed.

It would have made it much plainer if these animals had been prohibited altogether.

IMPROVEMENT OF BERRIES BY SELECTION.—It matters not what plant may be cultivated or animal may be kept for breeding, the progeny can always and with certainty be greatly improved by continuous selection. The raspberry, blackberry, strawberry, and all other berries can be made to yield larger crops and finer fruit by selecting canes, crowns, runners, &c., only from the best and most prolific plants. So with grape vines, by selecting and reselecting cuttings from the best runners of the most prolific vines, the crop of large, fine fruit can be very greatly increased.

HORTICULTURAL NOTES.

The most simple and effective remedy for aphides on trees of any kind is to cover the tree with a calico tent and burn some waste tobacco in a flower pot or other suitable vessel. Within twenty minutes there will not be a single aphid left alive if the smoke has been anyway dense. Waste tobacco can be purchased from the Public Storekeeper, Port Adelaide, at the nominal price of 3d. per pound, and 3ozs. is ample for the fumigation of one tree.

American papers report very unsatisfactory prospects for the apple crop, in most of the apple-growing States the crops being below last year's. This is bad for the American growers, but will doubtless be cheering to our orchardists, and with a fair crop this coming season we may expect a profitable outlet for our fruit in London, though such prices as were obtained last season cannot be expected.

A new fungicide, said to be very effectual as a pickle against bunt in wheat and for treatment against other parasitic fungi has been discovered by Mr. Walter P. Swingle, of the U.S. Department of Agriculture. The name is made up of the initials of the chemicals used—soda, alkali, resin. To make a stock solution, use a wooden barrel—metal will spoil the mixture—place 15lbs. flowers of sulphur in the vessel, mix thoroughly in it 8ozs. pulverised resin, stir in 3qts. water. This should make a thick paste. Then add 10lbs. concentrated potash lye (Greenbank's by preference), stir well with a broad wooden paddle to prevent it running over, as it will generate heat and boil vigorously without any fire. When it ceases to boil add slowly 2galls. of hot water, and then pour the mixture into a wooden vessel and add just enough water to make it up to 6galls. This stock solution must be kept closed to exclude air. When required for use, 1½pts. is sufficient to add to 50galls. water.

Mr. E. A. Stoney writes that he actually saw crows attacking apples on the trees. Last season they did not attack the grapes, and they were not prevalent whilst the locusts were destroying peaches; but when all other fruit was gone, and locusts had departed, the crows suddenly appeared and attacked the apples—a thing not known before. In other seasons the crows have left the locality directly the grapes were gathered, and did not return until the young wheat plants came through, when the crows pulled them up. Crows have been seen eating small codfish, carrion of every description, insects of all kinds, eggs, fruit of all sorts. They attack and kill weak animals, peck out the eyes of lambs—in fact they are omnivorous; but the good work they do in destroying injurious insects of all kinds far overbalances the little injury they inflict. They are, fortunately for their enemies, very cunning, else they would have been as scarce as the dodo or the great auk.

In writing the Hobart *Daily Telegraph* last month Mr. J. G. O. Tepper, F.L.S., says he is of opinion that the potato moth (*Lita solanella*) deposits her eggs on the stem of the plant, and just below the surface. When the young caterpillars emerge from the egg they make their way to the tubers if the soil is loose. They only attack potatoes in the soil late in the season; but will continue to multiply all the time there is a tuber left in the storeroom after being harvested. He also combats the idea that the caterpillars tunnel or bore the stalks of the potato plant. The moths are not attracted by a light, and do not fly much unless disturbed. He recommends early digging before the foliage is quite dead; pack in sound clean bags, safely tied; clean bins and storerooms; destruction of all putrid and grub-infected tubers—these can be boiled and fed to pigs, &c. [We have in the Bureau office specimens of the potato moth, hatched from caterpillars taken from the tunnels in stems of potatoes grown at Burnside, where they did much damage to the foliage.

If the potatoes are infested with potato moth put them in a tank, place saucers of bi-sulphide of carbon on top, make the tank as close as possible—place a tarpaulin over—and in twenty-four hours all caterpillars and moths will be dead.—Ed.]

Isaac Birdsall, New York, U.S.A., wrote *American Agriculturist* that he has been feeding apples to his cows for over fifteen years with highly satisfactory results. He begins the season by giving only a few quarts, and gradually increases until they receive $\frac{1}{4}$ bush. daily in addition to 1qt. of wheat middlings at each meal. As there is almost a certainty that there will be a good lot of culls and wormy apples this season it is well to know that they can be utilised in this way.

Persons who dry fruits on trays made of galvanized iron or galvanized wire should be made aware that such fruit is considered to be dangerous to public health by the German Government, and anyone selling such fruit is liable to have the same forfeited and to be also subjected to fines. When fruit is sulphured it must never be so treated upon galvanized-iron wire trays, because the sulphur dissolves the zinc and the sulphate of zinc penetrates the fruit.

Sulphuring of dried fruits doubtless makes them look "pretty," but this is altogether at the cost of the flavor and good quality of the product. If people will sulphur, they should be careful not to poison at the same time. To avoid injury from sulphate of zinc the trays should be made of wooden slabs or hessian, or similar non-poisonous material. The bamboo baskets from the Sugar Refinery Company's works could be made use of for the manufacture of drying and sulphuring trays.

ON BLEACHING FRUITS.

(Perpetrated in "Californian Fruit Growers' " Offices.)

To sulphur, or not to sulphur, that is the question.
Whether 'tis better that the stomach suffer
The aches and pains of outraged dieting
Simply that the eye may be beguiled,
Or to take arms against dyspepsia's shafts,
And by opposing end them? To linger on
No more; and by word and act terminate
The growing evil and the thousand other shocks
That sulphured fruits do breed. 'Tis a consummation
Devoutly to be wished. To bleach our fruits— to sigh,
To ache—perchance to die!

Ah! there's the rub.

For in that sleep of death what dreams may come,
When we have shuffled off this mortal coil,
That give us pause. Then shall we know
What made calamity of this, our promising life,
Made us bear the incessant whips and thorns
Of our stomachic troubles, and grunt and sweat
Through a weary stay! And thus the hue of resolution
Is sicklied o'er with the pale cast of thought.
Knowing this, shall currents turn away
And lose the name of action?

Soft you now—

Decide and act; reform it altogether,
And let those who play the clown speak no more.

SPARROW POISON.—Required—112lbs. small grain wheat, $\frac{1}{2}$ oz. Blundell's strychnine, 1oz. acetic acid, 7qts. water. Mix acid and strychnine in a bottle containing 1pt. water; shake, and let stand two hours. Then mix the solution with the rest of the water, and pour the wheat slowly into the poisoned

water. Stir frequently during two or three days, using a flat board, so as to get a thorough mixture. Finally dry the wheat on iron sheets, and destroy by fire or thoroughly cleanse all articles that have been used in making the poisoned bait.

ARSENITE OF LIME appears to be at least equally effective with Paris green as an insecticide, and possesses the further advantages of being much cheaper and more readily and easily applied. Paris green is heavy, and requires a strong agitator to keep it afloat in the mixture during application; arsenite of lime is much lighter, and, being white, shows itself on the tree when applied, thus ensuring perfect envelopment of the leaves, fruit, &c., with a thin film. Another great advantage is that a stock solution could be kept, which is not the case with Paris green. Two vessels are required to maintain a stock solution of arsenite of lime. First slack 2lbs. of lime, and add this to 40galls. of water. Keep this in one vessel. Boil 2lbs. of white arsenic and 8lbs. of common washing soda in any old iron pot not used for other purposes; boil for about one hour until the arsenic is dissolved. Keep this separate also, and mark "POISON-stock for spraying." One pint of this added to the 40galls. of lime water will make the solution ready for use. Do not spray until the "leaves" or petals of the flowers have fallen off.

CODLIN MOTH REMEDIES.—The *Rural Californian* of May, 1898, says—"Paris green solution has almost entirely superseded the band and trap systems of fighting the codlin moth, for no matter how carefully the bands and traps were attended to, enough of the larva escaped to give the next season its full quota of wormy apples and pears. With arsenic poison we destroy the worms before they have destroyed the fruit. This important remedy was first used for the destruction of the moth in 1880, by Professor A. J. Cook, then of Lansing, Michigan. Since that time Professor Cook has tried many experiments with both Paris green and London purple, and he does not hesitate to recommend the spraying of infested fruit trees with either."



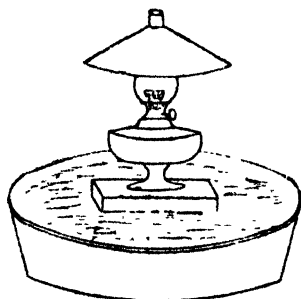
A HANDY FRUIT LADDER.

A cheap and handy fruit ladder is made use of by fruit-growers in the hilly districts by merely sawing a long pole down the middle after boring the holes for the rungs. The top end can be placed between the forks of the branches, and there is never any necessity to climb to the very top of the ladder. It is safer and lighter than the ordinary ladder. Several cherrygrowers adopt the practice of sticking a rail amongst the branches, and sometimes this causes the forks to split, so that there is considerable danger to the cherry picker—both of tumbling off whilst performing balancing feats or of being precipitated headlong through the splitting of the forks.

HARNESS BLACKING.—Mutton suet, 2ozs.; beeswax, 6ozs.; white sugar, 6ozs.; soft soap, 2ozs.; powdered indigo, 1oz. When all have been melted together and well mixed, add 4ozs. of turpentine.

CATCHING MOTHS.

Some kinds of moths lay many thousands of eggs, whilst others produce under a hundred. Each egg, under favorable conditions, may give being to a caterpillar, and each caterpillar will eat or destroy an enormous quantity of vegetable food. Some will attack the bark and girdle the limbs, &c., till they are killed; others bore tunnels till the stems or limbs are rotten and break off; a few live upon clothing, books, &c.; very many live upon fruit, amongst them being the codlin moth; many others live upon tubers, as the potato moth caterpillar; and the great majority live upon the leaves and stems of plants, and are especially annoying when they attack our cultivated crops. It should naturally occur to most people that if the moths could be destroyed before they lay their eggs there would be fewer caterpillars. Now, very many kinds of moths are fascinated by a bright light at night, and the following idea has been successfully adopted by several gardeners:—



The lamp is placed alight in the place where the moths are likely to deposit their eggs, on a brick in a dish of water, on the surface of which a tablespoonful of kerosene has been poured. The moth flies at the light, strikes upward, touches the shade, and drops at once into the kerosene, and its troubles are over. It should be noted that caterpillars cannot travel very far as a rule, so that if the moths are prevented laying their eggs somewhat near to the field to be protected the crop will not have many caterpillars to contend with.

But the codlin moth and some others cannot be attracted by a light, nor do the moths eat anything; they do all their eating whilst in the caterpillar stage. The sole object of this moth appears to be to drop its eggs in some place where the microscopic caterpillar when it emerges can find suitable food to enable it to grow larger. No doubt seems to exist that this moth is guided to suitable spots by its sense of smell; and taking advantage of this very common characteristic of many insects, our clever horticulturists have devised traps baited with "delicate food" for their insect enemies. Here is a sample:—



This is simply an old jam tin, slung by its rim to a limb of a tree. A broken bottle or anything that will hold liquid will do equally well, and no patent nostrum is required. Make a syrup with 3lbs. sugar in a gallon of water, then put half a pint—more or less—into each vessel so slung amongst the branches, and stir into each a good large spoonful of jam made of apple (with peel cooked with it by preference). Within twenty-four hours the liquid will begin to ferment, and the odor will attract codlin moths which desire to deposit their eggs, and they, together with very many other moths, flies, and insects, will be drowned in the sticky liquid. The worst of it is that the dry weather soon necessitates a renewal of the liquid.

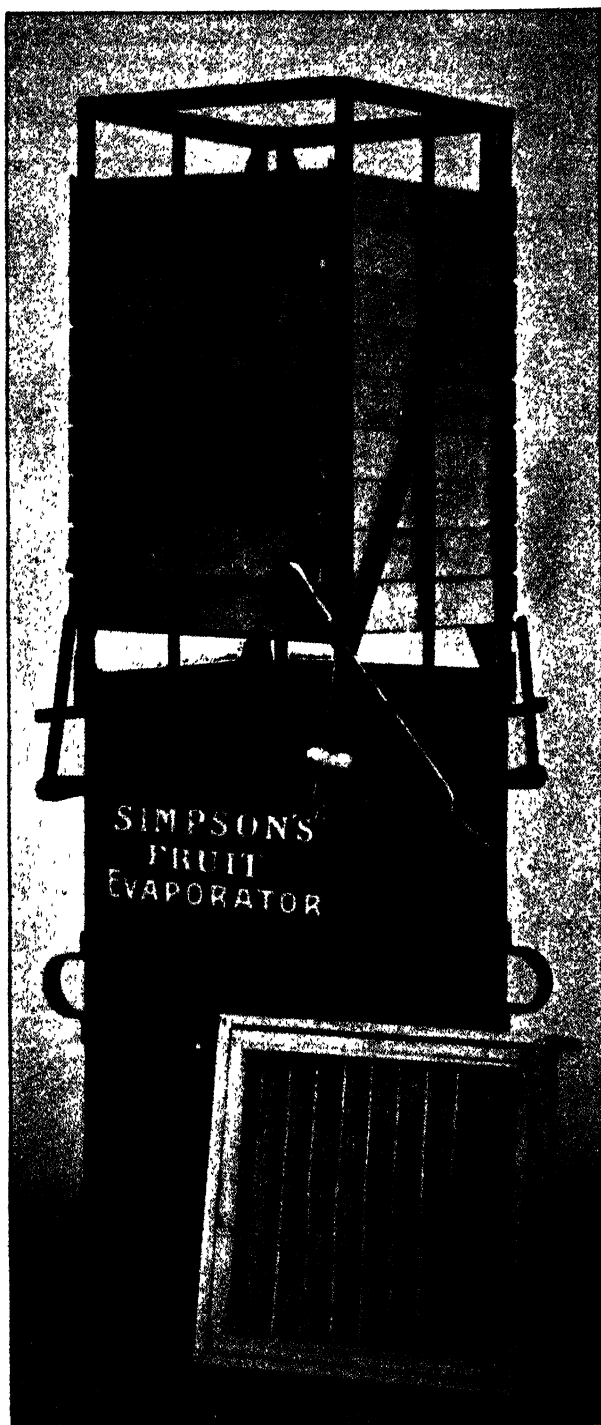
FRUIT EVAPORATION.

For many years past the General Secretary of the Agricultural Bureau has endeavored to induce tradesmen to take up the manufacture of fruit evaporators, and he is now greatly pleased to learn that Messrs. A. M. Simpson & Son, Gawler place, Adelaide, have commenced making a splendid pattern of evaporators in several sizes.

The greatest advantages of evaporation by fire-heat as opposed to sun-heat are—rapidity of work; certainty of effect; evenness of sample of product; immunity from insect attacks; superior flavor and quality of the dried fruit; freedom from dust and dirt; and saving of labor and time.

The fruit should all be in just the right condition when gathered for drying, whether by sun-heat or fire-heat, and to ensure this it may be necessary to go over the trees half a dozen times, gathering each time only that which is just ripe enough. This fruit should be prepared at once for drying, because if it is left for any time it will lose much of its proper flavor, become stale, flaccid, and even bad flavored. Apples should be peeled, cored, and sliced by aid of the machine or tool made for the purpose, and as the slices drop they should fall into a tank or tub containing water to which 1oz. of common salt per gallon has been added. This is to preserve the white color. From this the rings or slices should be removed to trays with cane or cheesecloth bottoms (never use metal of any kind), and subjected to sulphur fumes for ten minutes. Next, place on cane or iron-wire trays and put them in the evaporator. When properly dried—not more than *just enough* to prevent any moisture squeezing out when pressed between the thumb and finger—drop the rings or slices into a bin in a moth-proof room, allow time to sweat and even up so that the whole of the fruit is of one even good quality, and then pack neatly in boxes or cartoons. Plums should be fully ripe, then dipped half a minute in a scalding lye made with 1lb. Greenbank's concentrated lye to 10galls. water; then rinsed half a minute in pure hot water, dried in the trays without sulphuring; then dipped again in boiling water on the surface of which a little glycerine is floating, drained, and placed in the moth-proof house to even up and sweat. It is not necessary to give directions for each kind of fruit; but it is very important to remember that it must always be of the right degree of ripeness, and as nearly equal as possible in size for each gang of trays passing through the machine.

This illustration has been kindly loaned by Messrs. A. M. Simpson & Son. They keep two sizes in stock. The larger size will dry from 90lbs. to 100lbs. fruit per day, equal to about 14bush. or 16bush. fresh fruit. They also make much larger sizes, capable of dealing with any reasonable quantity of fruit. The furnace is so enclosed that no smoke can pass up the shaft to taint the fruit, but the heat ascends to the top, through and around the trays. A lever



with handle lifts the whole pile of trays about 6in. each time ; a set of clutches beneath projects and retains them whilst the carriage descends and leaves an opening for insertion of a fresh tray. By the time the bottom tray reaches the top the fruit should be sufficiently dry, and it can be removed, the fruit dropped into the bin in the moth-proof chamber, and the tray returned to be refilled.

ORCHARD NOTES FOR NOVEMBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

The soaking showers which have fallen recently should bring the orchard grounds which have not already been broken down with the cultivator into good working condition. The cultivator should be passed through the soil again, even in those orchards where the first scarifying has been done. because it may be some time before more soaking rains fall, and moisture should be conserved in the soil as far as possible.

Where the crops have not been damaged badly by hail or winds, these rains should give splendid samples of apricots.

The strawberry growers will, in all probability, obtain a better "second" crop this season than for several years past, owing to the rains falling late in October. Those who have taken the precaution to cover the surfaces of strawberry beds with litter or seaweed will most likely have the satisfaction of retaining their fruits fairly free of sand and grit. It is gratifying to note the increasing numbers of berry-boxes and punnets now in use in the harvesting of this delicious fruit, and it is only a matter of time when all small soft fruits will be marketed in this cleanly manner.

The thinning of fruit is a most important matter here, where the seasons are so uncertain, and where the trees have a tendency to set more than their vitality can sustain. In thinning almost any kind of fruit the general health, size, and vigor of the tree should be considered; thus no fixed rule can be made, as these points differ in each tree, and on each branch to a certain extent. The careful observer will soon learn how much fruit his trees can mature, while at the same time enough growth and buds are matured to provide next year's crop.

As the month progresses it may be necessary to water newly planted trees, but with the rains referred to, if good prompt cultivation be given, there should be little need for artificial waterings for some weeks.

There are complaints of apricot trees dying largely this season. Should any tree show signs of distress, the fruit should be removed and the tree headed back into healthy wood. This, with watering, will sometimes resuscitate them, but very frequently when signs of collapse are noted the injury is too far gone to repair.

If water is applied to any tree by means of circular trenches, always take care (as soon as the surface is sufficiently dry to be workable) to pulverise the ground where the water soaked in. Do not merely cover in the trenches with dry earth, but stir them all equally, this will prevent a hard pan forming where the water was applied.

The setting out of citrus trees may be safely undertaken where care is used, and good supplies of water are at hand.

The disbudding of young trees to secure a good shape, or the thinning out of dense lateral growths on fruiting peach, plum, or apricot should be performed with the thumb and finger. When all the loquats are gathered, the dead stems where fruits have been carried should be cut away cleanly. All

old dead fruits should be cut off and burnt, as they may harbor the spores of a parasitic fungus (*Fusicladium eriobotryæ*), which is sometimes present on our trees.

The budding of citrus trees may be performed now, when buds are available. Beginners should avoid buds with thorns attached, and only select buds from trees known to be good regular bearers of fine fruits. Sprayings should be given frequently with tobacco and soap compound where aphides are numerous on peach trees, until they are suppressed.

I have found 2ozs. strong tobacco and 6ozs. bar soap boiled to each gallon of water a perfect remedy for this pest.

Sprayings with Paris green (Blundell's) at the rate of 1oz. to 10galls. of strong limewater should be given fortnightly to apples and pears to suppress the caterpillars of codlin moth.

In my experiments at Marion last year the arsenite of soda, made by dissolving by boiling 1lb. common arsenic and 2lbs. washing soda in 1gall. of water, and using this at the rate of 1pt. to 40galls. of strong, fresh limewater, gave good results, and was much cheaper than Paris green.

If the bandages have not been placed on the stems of apple, pear, and quince trees, and any other trees close to these sorts, they should be fixed at once, and as soon as any larvæ are found regular weekly examinations must be made to catch them. The soil should be finely pulverised around and beneath trees the fruits of which are subject to the attacks of this pest.

NOTES ON VEGETABLE-GROWING FOR NOVEMBER.

BY GEORGE QUINN.

The successional sowings of dwarf and runner beans should be continued, at intervals of a fortnight. The chief difficulty appears to be in obtaining an even "plant" of these. The Chinese gardeners adopt the process of covering the seeds with a mulch of loose stable manure—not necessarily decomposed. This does not become encrusted, and consequently the tender germinating growth when unfolding can force its way through to the surface. If manure is not available, the next best plan is to soak the ground prior to sowing the seeds, and when the surface is workable it should be pulverised and the seeds sown. As a rule no further watering will be required until the plants emerge.

Sowings may be continued of all the melon family. The season is now advanced, and these late sowings should be forced. The best method is to make holes, as if about to plant a tree, put in the bottom a couple of barrow loads of thoroughly rotted manure, cover this with a few inches of soil, and sow the seeds, afterwards mulching the surface.

The secret of success in growing all cucurbitaceous plants lies in keeping them growing strongly, but unless the atmosphere is suitable this is a difficult task. They will stand vast amounts of water, and overhead watering at night is highly beneficial.

Red and silver beets may be sown. In cool places radishes, lettuces, and cresses may be sown for salad purposes. Excepting in the damp, cool gullies in the hills, it cannot be hoped to grow these salad plants to any size; they should therefore be used very small and young.

The harvesting of onions and potatoes on the plains will be in progress. Potatoes should be stored as soon as possible, to prevent the potato moth

caterpillars doing much harm. Onions should also be housed when dry, but before the sun has had an opportunity to scald the bulbs.

These vegetables should be handled more carefully than they usually are. Only onions which keep long, or those which mature early, should be grown for profit.

Tomatoes should be growing strongly now, and young plants may yet be set but with fair results. These plants should be staked, and tied carefully from time to time as growth is made, so that the fruits may be kept from direct contact with the soil.

The application of liquid manure to summer vegetables is very profitable in small gardens, but care should be taken not to pour the liquid over the foliage.

The vegetable gardens in the cool gullies in the hills will be scenes of great activity now, and all kinds of vegetables grown that will not stand the intense heat of the plains. The operations for the vegetable gardens in the hills in November approximate closely to those of May and June on the plains.

Asparagus plants should now be allowed to make all possible growth, so that they may accumulate strength to produce growths for next year's cuttings. Now is a good time to apply stimulating manures to these plants. The Americans use a compound of muriate of potash three parts, and nitrate of soda one part.

On old beds I note they use 30lbs. of the former and 10lbs. of the latter to the square rod, but these beds must be much exhausted. I would suggest a somewhat weaker application.

FARM NOTES.

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,
ROSEWORTHY, SOUTH AUSTRALIA.

Written for the "Journal of Agriculture and Industry."

The harvest is again upon us. Most farmers are busy with their hay, which, by the way, last week's rain did not improve. On the college farm we had about 200 acres down when the rain set in, and as far as this particular farm is concerned we would have preferred to have escaped the $\frac{1}{2}$ in. of rain which fell. As I write it seems as if another depression likely to bring rain is approaching, and if so it will do us harm, as the wheat is too far forward to benefit, and the quality of the hay in the stook will be deteriorated. No doubt summer crops, of which we have between sixty and seventy acres, will benefit, but the gain will not recompense for the damage to hay. If last week's rain had fallen three weeks or a month ago the gain from it, I believe, would have been up to a bag of wheat per acre. As it is the wheat crops in this district promise well, and things are assuredly much better than they were at the same time in the two immediately preceding years. Wheat has held on and is filling wonderfully considering the long spell of dry weather experienced. There is as usual on this farm ample evidence in favor of early sowing, and in favor of early wheats. Late wheat and late sown wheats have suffered, but early varieties and early-sown wheats will yield well relatively.

Again we have evidence of the supreme position of wheat among farm crops at all suitable to our climate. Peas have succumbed to the drought, and other cereals are very middling in the district, but wheat struggles on with really marvellous vitality.

For the cutting of hay nowadays the binder is almost universally used. If the binder trials conducted were sufficiently thorough one should have no difficulty in selecting the best, but so far I do not think the competitive trials have

been in any way sufficiently exhaustive. The trials held so far, from what I have seen and from what I learn, have been rudimentary in the extreme. If the competitors could be set to cut 200 acres each on the same farm, using the same twine and that of average quality, the same oil, the farm teams in due rotation, and the farm workmen in similar rotation, and if the judge who superintended the work throughout made regular tests of the draught, and by the aid of assistants noted all stoppages from whatever cause, the number of sheaves untied, the cost of parts required for repairs, the weight of twine used, and the state of the machines at the close, some indication would be given of the relative merits of the machines on the market. If the same machines were put through the same test in two succeeding seasons the trial would be still more valuable, but as trials have been held farmers themselves seem to ascribe very little importance to them, and I think legitimately. If the college farm here were 3,000 acres or thereabout in extent it would be possible, as we bind wheat as well as hay, to conduct such a trial. Students could be detailed to follow the different machines, and note regularly stoppages, &c., for the judge, and machines from the different agents could be purchased for the trials; but on our present area of a little over 1,000 acres for farming the area which we have in crop, 500 acres, is not sufficient for the purpose.

It is not to be forgotten that in a sense it is the good man working the machine that makes the good binder. Much attention to the details of the mechanism while working and much experience in working a machine is necessary to make the most of it. Another matter that affects the work of binders in a much greater degree than the average farmer allows is the quality of the twine used. To my thinking cheap inferior twine for use in the binder is bought several times over, and is ever the dearest. Often fault is found with the knotter or other part of the tying mechanism when inferior twine accounts largely for the deficient work. When twine is purchased, the number of yards of it to the pound and its average breaking strain should be measured, but most men do not take trouble to ascertain important points in the quality of the twine such as these, and are prone to consider the price as the most important item in the bargain. To my thinking it is the least important consideration, unless in relation to quality thoroughly ascertained. The stoppages of the machine through inferior twine breaking, the mess of loose sheaves in the field, and the consequent extra trouble in stooking, make bad quality twine dear even if it be had for nothing.

In the issue of this journal for November last year I discussed the stage of ripeness at which to cut cereal hay, and the varieties of cereals best suited for hay in this colony, and as old numbers of the *Journal* are available to such as may wish to compare my notions with their own opinions, I see no reason to refer to these matters again in this number.

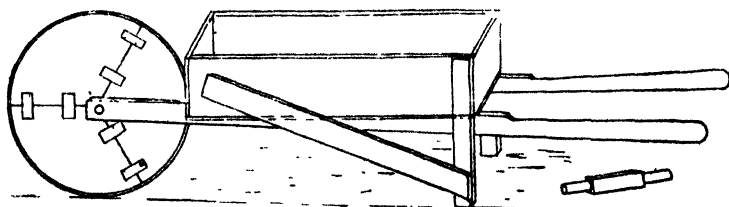
EASY ENSILING.

Professor Massy, North Carolina Experimental Station, U.S.A., wrote an Australian farmer, stating that he found the complicated pressure appliances, levers, trampling, &c., adopted in Australia are altogether unnecessary, and even detrimental. "It is easier to make good silage than to spoil it," he says. He simply places the green fodder in the pit, simply keeping the whole level, and well filled in the corners. He does not even use the wooden cover, but puts on a stratum of straw. He is careful to make the silo tight at the sides and bottom. A wooden silo above ground is better, he thinks, than any brick or stone building. The waste from decay of silage in stacks would soon pay for a building, and we do not favor the stacking. All we want is a building,

no matter how cheap, and into this we cut the corn when fairly eared. We cut slow or fast, as suits our convenience, stopping if need be a day or two at a time, but never stopping because of rain, for we have cut when it was dripping wet, and had the best of results. We keep one man in the silo to level the mass as cut, but do not allow any tramping that can be avoided. When full we cut a thick layer of straw over all, and the work is done.

SOME HELPS FOR THE FARMER.

A simple and strong rough barrow can easily be made with a few pieces of board and two pieces of scantling, with some nails or screws, and hoop iron. The wheel can be cut out of a 2in. board and the spindle from a piece of shea-oak or other hard wood. The tire may be a piece of hoop iron taken from a bale. The barrow will be all the stronger if the ends of the spindle are confined *beneath* the ends of the under carriers by pieces of hoop iron made thus :



The above illustration will give a general idea of how the barrow might be constructed.

LIME AND ITS USES IN AGRICULTURE.

The substance known as lime exists in several combinations in nature, the most common being carbonate of lime and sulphate of lime, or limestone and gypsum respectively. When limestone is burned the carbon is driven off, and calcium oxide (Ca O) remains, with perhaps a little impurity in the shape of sand, iron, &c. When gypsum is burned a deal of water is driven off, and sulphate of lime, or plaster of Paris, is the result. If plaster of Paris or if pulverised gypsum is sprinkled freely over nightsoil, blood, offal, or other malodorous organic substances the bad smell is at once arrested, and the value of the substance as a manure is greatly improved. If lime, however, is mixed with putrefying matters of a similar nature, the effect is distinctly opposite; the ammonia is driven off rapidly, and the value of the manure is very considerably diminished.

Lately some badly-informed or dishonest persons have treated gypsum, sea-shells, and limekiln screenings with sulphuric acid, and have sold the resulting sulphate of lime under the name of "superphosphate"; but there is scarcely a trace of phosphoric acid in this compound, and it is actually of less value than calcined gypsum, which ought not to cost more than 30s. per ton delivered on Port Adelaide wharves, ex bags.

Freshly-burned lime soon absorbs moisture from the air, and far more quickly breaks into a powder if water is poured upon it. It then becomes hydrate of lime. More slowly it takes in carbonic acid from the air or from the soil, and in this combination is as insoluble in water as it was before it was burned. It is therefore necessary to use the lime before it assumes this latter form, when it

will exercise a considerable influence upon the "mechanical condition" of either clay soils or sandy soils, making the clay soils loose and friable, and tending to make the sandy soils more compact.

Lime is necessary to nearly all plants, but there are few soils in which lime is not in sufficient quantity for all requirements, though it is often present in an unavailable form. Where, however, it is deficient, it will be needful to supply it. On light sandy soils lime generally gives good results, and it gives better return when used in conjunction with ploughed-under green crops than under any other circumstances. About 40bush. of lime per acre is required for the first season, and 10bush. per acre each year after, until the full desired result has been attained.

The most economical way to slake lime is to put it in a heap, cover with sand or light soil, and pour on sufficient water, through an aperture on top. It is better to pour in three or four small doses at intervals of fifteen minutes than to apply it all at once. When the lime is reduced to a powder carry it out on to the field, and spread and harrow it in at once.

Either pulverised or calcined gypsum may be applied beneficially at any time of the year to land requiring lime; but quicklime gives best results when applied during autumn. Wheat, barley, oats, beets, clovers, and grasses benefit at once from application of lime upon heavy clay soils, but on light sandy soils the action is slower. Onions, celery, plants of the cabbage family, lettuce, spinach, and many other plants benefit from lime, but cucurbitaceous plants—melons, &c.—may suffer from liming.

With lime alone no one can hope to do much. The soil must contain sufficient potash, nitrogen, and phosphoric acid for the plants. Lime should not be applied for a crop of potatoes, as it is likely to promote scab. It may be used after potatoes where one of the crops above mentioned is intended to follow.

THE PROPER USE OF GYPSUM.

It has been made necessary owing to some erroneous statements recently published to again warn farmers and others not to be misled with respect to the value and uses of gypsum—whether crude, or prepared, or manufactured. Gypsum has valuable properties, just as salt, or lime, or sand may be valuable when applied to their proper uses. Gypsum (CaSO_4) consists of lime, sulphur, and some impurities—such as common salt (Sodium chloride)—but *does not* contain phosphoric acid. If gypsum were added to a superphosphatic fertiliser it would be injurious to the superphosphate, or if phosphoric acid were added to gypsum it would go far to spoil it. No possible method of treatment will make a profitable or useful *phosphatic* fertiliser with gypsum, and those who pretend or propose to make "superphosphate" from gypsum, or with gypsum added, are either ignorant of the matter they propose to deal with or they are desirous to make victims of their customers.

But gypsum has its uses on the farm, and farmers should make good use of it. It has the property of making heavy clay soils lighter and more friable, and, by dissolution of the compound of sulphur and lime, forming fresh combinations with the constituents of the soil, it releases plant food which was previously locked up in an insoluble form. Quicklime has a similar effect. In America gypsum is known as "land plaster," evidently from the name "plaster of Paris," which is made from gypsum by subjecting it to fire heat and driving off the greater portion of its water constituent. "Land plaster" is considerably used in the United States for its ameliorating influences upon heavy clay soils, but no one ever thinks of using it as a "manure."

The common limestone of this part of the world is calcium carbonate or carbonate of lime, and when this is burned we get rid of the carbonic acid, and the result is what we call "lime."

When gypsum is burned it becomes "plaster of Paris."

Gypsum acts quickly upon putrid and fermenting substances; more quickly when calcined or pulverised. It stops the escape of ammonia, and at once prevents all bad odors. If sprinkled on putrid blood, offal, excreta, or on dungheaps, cesspits, drains, styes, or other evil-smelling things or places the nuisance at once ceases, and the manure resulting from treatment with gypsum will be of much higher value than if left untreated.

To make bones more soluble we crush them and mix them with sulphuric acid. The sulphuric acid combines with two-thirds of the lime of which the bones are composed, leaving only one part lime, one part phosphoric acid, and two parts water, or what we call superphosphate. If we add some lime or some sulphate of lime (gypsum) to our superphosphate we cause it to return to its former insoluble condition. Therefore it is absurd to talk of converting gypsum into a "phosphatic manure."

CARE OF YOUNG PIGS.

When a sow is about to farrow there should be only a moderate amount of short straw in the pen, and a board should be placed edgewise across the farrowing pen, so that the mother cannot roll over the young pigs. Whilst the sow and litter should be disturbed as little as possible, enough attention must be given to see that all the pigs suck; and to prevent the disease which causes their tails dropping off they should be anointed once a day for four or five days with grease in which a little carbolic acid has been mixed. The young pigs with their mother should be kept in a small dry run separately for three weeks, and there should be a place divided off, with a small trough for the little ones to feed apart from the mother when they are ten days old. Give them only as much sweet milk, mixed with meal, as they will eat clean out at once. When the pigs are to be weaned it will be necessary to give a distinct change of food and much more of it.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

October 31st, 1898.

At date of our last, as mentioned, the agricultural outlook throughout several extensive districts was then in a critical stage from lack of moisture, owing to a very dry September, and unfortunately during the subsequent four weeks practically no rain fell. This destroyed the fair prospects of many places, in some irredeemably ruining the chance of a fair harvest, particularly over our driest agricultural areas—mostly outside Goyder's line of rainfall—which had suffered so much during the previous three bad seasons. Throughout a great portion of the farming country, however, the rains that have fallen (nearly in.) during the past few days will ensure at least a fair wheat yield, and in many places restore the plant where it had apparently ceased to grow. The moisture, though delayed, will do a great deal towards freshening up and continuing the growth of natural feed in pastoral and dairying country, and renew the supplies of water.

Business generally has been quiet, with reduced exportation of produce to intercolonial markets, the influence of the dry time accounting for the dullness shown, an improvement being noticeable during the few days that have elapsed since the general rains.

In breadstuffs the market has been what is known in the trade as a "weather" one. Whilst the rain held off prices continued to firm, but since values have receded, and at moment there are no buyers so that possibly even a reduction on present quotations would tempt sellers. Authorities are now venturing to estimate a five-bushel harvest as against eight expected before the trying drought came. This modification will, unfortunately, from the same cause apply also to estimates made both in New South Wales and Victoria as to their probable yield. Even 5bush., however, will give us here a larger exportable surplus than we have reaped for several years past, and the widespread failure of crops in Russia,

with the attenuated stocks at the beginning of the Northern Hemisphere's harvest, point to the probability of the world's price ruling higher than was reckoned on when authorities a couple of months ago prognosticated a record yield of wheat for the world. The lessened export for Australasia should make freights easier and allow shippers to pay better prices for grain. The prospects of a poor yield in New South Wales prior to the rain caused speculators to operate in flour, clearing out Melbourne stocks and submitting offers to this market. The altered weather conditions, however, have stopped further operations in this direction. In millers' offal lines bran is scarce with price firm, so little being at present made; pollard, however, is more plentiful, and, if anything, lower than bran.

The potato market has been mostly supplied by the new crop from local sources, a few old season's imported coming forward, generally in unsatisfactory condition; values have ruled steady during the month. Local onions are reaching market in increasing quantities, and price has therefore fallen away from the extreme rates so long maintaining, but are still high considering their immature condition, with consequent difficulty in transportation preventing business being done intercolonially, whence inquiries have been received.

Supplies of butter during the past month have continued to increase, though somewhat slowly, the heaviest shipment from our port to London for the season, per the *Britannia*, consisting of 762 boxes, comparing very unfavorably with the quantities sent away before the disastrous drought set in three seasons ago. A few speculators are placing in cold stores, anticipating a shortage towards the end of summer, but the quantities held will not be heavy as prospects in the other dairying colonies favor a fairly heavy yield during the next three or four months. Values have oscillated slightly, but are now again at about rates quoted a month ago. A very lively market for eggs has been maintained, values advancing a further 2d., with some buying orders from West Australia still having to be declined. Present rates may not sustain till Christmas, but any great falling away in price is hardly probable, as the rapid upward movement prevented many bakers and others from securing their future requirements as usual at the cheap time, so that any drop in value would again bring out these buyers. In cheese prices further eased, and although probably not yet at bottom rates, the season does not promise heavy supplies. Bacon has continued to droop slightly, but demand is increasing, so that no serious downward move in the line is looked for, at least until after harvest, when the live material may be expected to become more plentiful. Hams are very scarce and saleable. Honey is somewhat dull, though price nominally unaltered. Beeswax active. Almonds meeting with improved demand.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, dull at 3s. 3d. to 3s. 6d. per bushel of 60lbs.
 Flour.—City brands, to £9 10s.; country, quoted £8 10s. to £9 per ton of 2,000lbs.
 Bran.—8½d.; pollard, 8½d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 8d. to 1s. 9d.; stout white, 2s. 8d. to 2s. 10d.; imported, nominal, 3s. 8d. per bushel of 40lbs.
 Barley.—Malting, 5s. to 5s. 6d.; feeding sorts, 1s. 8d. to 1s. 10d. per bushel of 50lbs.
 Chaff.—£2 10s. to £2 12s. 6d. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—New local, £12 10s. to £13 10s. per 2,240lbs.
 Onions.—£6 10s. to £7 per 2,240lbs.
 Butter.—Creamery and factory prints, 8½d. to 9½d.; dairy and collectors' lines, 6½d. to 8d. per pound; best bulk factory, 9d. to 9½d., chilled, f.o.b.
 Cheese.—S.A. Factory, large to loaf, 6½d. to 8d. per pound; matured imported, 9½d. to 9¾d. per pound.
 Bacon.—Factory-cured sides, 7½d. to 8½d.; farm lots, 7d. to 7½d. per pound.
 Hams.—S.A. factory, 8d. to 10d. per pound.
 Eggs.—Loose, 10d.; in casks, f.o.b., 11½d. per dozen.
 Lard.—In bladders, 5½d.; tins, 4½d. per pound.
 Honey.—2½d. for best extracted, in 60lb. tins; beeswax, 1s. 2d. per pound.
 Almonds.—Soft shells, 3½d.; kernels, 9d. per pound.
 Gum.—Best clear wattle, 2½d. per pound.

WEATHER AND CROP REPORTS.

AMYTON.—We have had very warm weather, with strong winds, drying up everything green. There has been no rain worth speaking of since August, and the splendid outlook then has been completely altered. Except in a few cases, the crops in this district will not return more than seed. Haymaking has commenced, but the yield will be light.

ANGASTON.—Feed is dying off, rain being badly needed. Several frosts have occurred, cutting the trees and vines in low-lying parts. The wool clip is good.

BALAKLAVA.—Very little rain, but plenty of wind during month. This has played havoc with the crops, and the yield for this district will not average half what it promised a month ago. Haymaking in full swing, an average area being cut. Frosts at end of September cut apricots and vines in some parts. Fruit crop generally will be light.

BOOLEBROO CENTRE.—We have had most exceptional weather for this season of the year—hot winds, gales, and no rain. Much damage has been done to windmills, sheds, &c., and also to the crops. The early-sown wheat is out in ear and standing well, but the late crops require rain very badly.

BORDERTOWN.—Rain is badly needed. We are experiencing hot days and cold nights, with severe frosts in places. The crops are suffering severely, and unless rain comes soon there will be a very poor average for this district.

BOWHILL.—We have had a very long spell of dry weather, which has proved detrimental to the crops, which are just coming into ear. Unless rain comes soon it will be as bad as last year. An inch of rain would ensure a fairly good average. Haymaking has started. Ear-cockles or purples are prevalent in some paddocks.

CARRINGTON. We are having terribly dry weather, and exceptional winds for this time of the year, drying up everything in the shape of vegetation.

DOWLINGVILLE.—The crops have suffered severely from absence of rain and prevalence of drying winds, and the prospects of a good yield have been greatly reduced. The late-sown wheat has little chance of giving any return. Haymaking is general, the cut being from 10cwt. to 15cwt. per acre. Feed is abundant, with stock in good condition.

GAWLER RIVER.—The crops took fairly well, but the dry weather is affecting them, and some patches have gone off altogether. Unless we have rain soon most will not fill out well. Feed is plentiful, but drying off fast. Stock in good condition. Wool clip good. Dry weather has interfered with fallowing operations. Caterpillars and other insects plentiful. A number of apricot trees are dying out: they blossom well, come out in leaf, but shrivel up and die.

INKERMAN.—The past month has been a very trying one. Day after day we have had heavy winds from north and north-west, drying off the crops and feed and breaking down the wheat. In some of the most promising crops quite half the grain has been lost. Owing to windy weather it is impossible to make much progress with haymaking, the ground being swept clean in some cases for several chains in width on the north sides of the paddocks. Reaping will be commenced by end of month.

KAPUNDA.—Rainfall for September 2in. short of last year. Early drilled and manured crops are much better than those unmanured. More rain is urgently needed. Late crops are very short and badly blighted. Haymaking is half over, and the yield much below expectations. Stock in good condition.

MOUNT BRYAN.—No rain to do any good since August. In most cases little if anything over seed will be obtained.

MOUNT REMARKABLE.—Owing to absence of rain since August the crops will not average one-third of what was expected. Severe hot northerly gales in October have had a disastrous effect on the crops. Frosts in September destroyed the potato and fruit crops in different places.

NANTAWARRA.—Less than $\frac{1}{2}$ in. of rain has fallen since last report. The wheat is mostly out in ear, many of the heads having gone white on top and contain no grain for two or three rows. In a few cases Steinwedel has shaken out badly. Some of the early crops will give a very fair yield. Stock in good condition, but the feed is drying off fast.

PORT ELLIOT.—The weather keeps warm and dry, but the rain early in the month wonderfully improved the prospects of the season. During the past eleven years the rainfall from July to October, both inclusive, for Hindmarsh Valley has averaged over 13in., but this year it is only one-half that amount. Crops are very early owing to mild winter, and haymaking is general, with satisfactory returns. Fruit of all kinds promises to be plentiful, and with the exception of our feathered fowls, we are fairly free from pests. Feed is plentiful, and stock in good condition. The supply of milk at the creamery is much in excess of last year's supply at this time.

REDHILL.—Less than $\frac{1}{2}$ in. of rain since last report. Hot winds have greatly injured the crops, the late-sown and late varieties being badly affected. There are some very good crops in this locality, and the early wheats are standing well. Except where heavily dressed, the manured crops are lasting quite as well as the unmanured. There is a lot of hay being cut here.

SADDLEWORTH.—Repetition of last October's dry weather is having a very serious effect on the wheat crops, particularly those sown late, on account of the wet during July. Haymaking has begun, and early-sown crops are good. This season's wool clip is sound and good. Practically no rain since last report.

WOODSIDE.—Since last report we have had a great deal of dry weather, but the rain on October 6 and 7 was just in time to do an immense amount of good. All vegetation now has a fine growth, and fair crops may reasonably be expected.

CONFERENCE OF HILLS BRANCHES.

A Conference of Hills Branches of the Agricultural Bureau was held at Mylor on Tuesday, October 25. There were present—from Central Bureau, Messrs. F. E. H. W. Krichauff (Chairman), A. Molineux (General Secretary), W. C. Grasby and George Quinn (Inspector of Fruit): and about forty-five members of Branches and visitors, the following Branches being represented:—Belair, Clarendon, Cherry Gardens, Forest Range, Hahndorf, and Mylor.

Gumming of Cherry Trees.

Mr. W. Nicholls (Mylor Branch) took the chair and introduced the business in a very short address, and then called upon Mr. E. J. Oinn to read the following paper:—

In walking through a piece of garden land or orchard a keen and closely observant man can take in a large number of small ideas at a glance, which many might pass by without seeing. For instance, he observes numerous minute flowers, their shape, size, and color; small insects, bugs, beetles, or the particular shape of some fruit on the trees, or the shape of the trees themselves, or the amount of flowers they have on them; whether they are thickly or thinly dispersed, how much blight has appeared, the method of pruning, and many other things of interest.

I have tried to introduce a few points about observation at the beginning of my paper, because the main subject is based upon observation alone. The block of land which is worked by myself and brother is situated along Leslie's Creek, between Leslie's Creek road and the old Echunga road. When we first came on the block some eleven years ago we worked up most of the gully land first, and being anxious to get some trees planted—cherry trees above all—we planted them in the gully on good deep soil, with a sandy clay bottom, and year after year our trees kept dying from gumming, and we were at a loss to understand why. But in order to try to save some of the trees we transplanted them to higher ground along the old Echunga road, because we had come to the conclusion that it was frost which caused the mischief; and since transplanting the trees on higher ground they have grown well and borne well also. It is said that this tree gums when it has been bruised or wounded. I believe this to be true in some cases, but not in all. The trees will sometimes gum a little after they have been pruned or knocked, but not for long. We hold the idea that the frost causes it in the low-lying parts of this district. The trees appeared sound in the autumn, but when the first heavy frost came we found them all frozen and covered with little pieces of ice. When the sun arose and melted the frost we found some of the stems and lower branches all wet, as if sweating, when all the stems of the other trees were dry, and they continued to get wet, although we wiped them dry several times, and never quite dried up till after midday. They were perfectly smooth and clean, and free from any fungus disease or wounds. We left them a few days, and then examined them, and found the bark turned black. On some of the trees it was all black, on others only in places, and on cutting away the outer bark we found all the inner bark wet and rotten, and of a brown color, emitting a strong smell, which could be noticed a good distance off. We left the trees until spring, and when the sap began to rise we noticed the black places in the bark begin to swell out into lumps. Those that were black all round did not grow at all; those that were partly black came partly into leaf, and some of the branches had fruit on them. The bark swelled out above the dead part, and they threw up a lot of suckers. But in the hottest part of the summer some of the trees died altogether, others only a few branches, and on those that kept alive the outside bark bursted, and the trees gummed very badly, and soon stopped growing for the season. As the autumn approached and the wood ripened, the living bark swelled out and left holes where the black bark was, thus giving the stems an ugly appearance. The spring following it was the same thing again. We noticed that they seldom gummed in the same place, and on examination we found all the bark was black and dead where they started gumming. It did not matter much where the trees were planted in the gully, whether on deep sandy soil or rough sandy gravel with clay at the bottom. The trees planted in the latter got on the best, and made much more rapid growth until they died from gumming. The frost is very harmful to cherry trees when it comes late in the spring and cuts the blossoms and young shoots.

In 1889 we lost no trees at all, because it was always cloudy or raining from early in the autumn till late in the spring, and we had no frost to speak of. In 1890 we had very heavy frost, and we lost a great number of trees from the effects of it. In 1891 we had the heaviest frost we

have known since we have been here. That year we lost the greater part of our cherry and plum trees on the flat. On the lower part of the hill the loss was for the most part slight; the soil there has a clay bottom. In 1892 the frost was not so heavy, and the number of trees that died was less. I would advise everyone to plant cherry or plum trees on as high ground as possible. It will not matter if the soil has got a good clay bottom, and it will not matter how stony it is so long as it has a fair depth of soil. With regard to remedies which have been suggested for the prevention of the gumming of the cherry tree, some suggest painting the stems with tar; others say that pruning the roots will prevent the trees from gumming; but is it practical? Again, it is suggested that when pruning the wounds should be covered with a mixture of whiting and oil; but I think the best cure of all is to plant the trees on as high ground as possible.

The GENERAL SECRETARY said "gumming" is always caused by a bacillus known as *Coryneum Beijerinckii*, which caused the sap to change into gum. The infinitely minute germs of this disease were present in almost every cubic inch of air in our orchards; and if any bruises or wounds were caused on the bark of the trees—either by spade handles or other implements, or by boring insects, or by shooting, or any other means—so that the sap became exposed to air, then "gumming" would probably follow. When "gum" is observed the diseased bark should be cut clean away and burned, and the wound should be painted over and fine sand sprinkled on the paint. Mr. RICKS asked if soil would have any effect. Mr. OINN said trees planted on sandy soil with stiff clay subsoil never did well. Mr. MONKS agreed with this. Trees do best when planted on stony or shaly-slate, where the roots cannot be drowned in stagnating water. Keep the stems short, else they will become sun-scalded, and this is largely the cause of "gumming." Mr. QUINN said the consensus of opinion was that "gumming" is due to some injury having occurred to the bark whereby the germs of the disease gain access to the sap.

Intense Cultivation.

Mr. C. RICKS, Cherry Gardens Branch, then read a paper entitled "Intense Cultivation as applied to Dairy Farming amongst the Hills." The following are the principal arguments:—

As the dairy industry is likely to become an important factor in the progress of this colony, the question arises as to whether there is a possibility of increasing the quantity and improving the quality of the dairy products. Not many farmers at present pay attention to the necessity for growing food for their cows, so as to secure a full supply of rich milk all the year round. It has been proved by many members of our Branches, and even in the dry districts, that maize, sorghums, mangolds, beets, swedes, lucern, &c, can be grown to a much larger extent than at present. Everyone will admit that conservation of water is a matter that has been very much neglected in the past. In the hilly districts there are splendid catchment areas, and ample opportunities for the storage of great quantities of water at comparatively small cost; but these possibilities are neglected, and the water flows without hindrance to the sea. Then there is the possibility of securing artesian waters. A great body of water was struck when making the tunnel from Clarendon to Happy Valley. If these supplies were properly utilised dairymen and others could grow great quantities of succulent and nutritious food for cows, etc., during the dry hot weather, when such food is most required. If South Australia is to take her place in supplying the home markets with butter we must make provision to keep up the supply, and in order to do this we must feed our cows constantly and liberally with nutritious food, and in order to do this we must grow it and use plenty of water and sufficient manures to maintain the fertility of the soil, else we shall lose our market. When we have good seasons and plenty of natural forage we must put as much as possible down in silos. In the hilly districts there is a good deal of natural herbage this season, and as much as possible of this should be saved. During the past five years dairy products to the value of £74,294 were introduced into the colony, including £11,704 for bacon and hams, £58,094 for butter, and £4,498 for cheese. Additionally there was sent through in bond from other colonies to West Australia and Broken Hill £130,982 worth of dairy products, much of which might have been produced by our farmers. At any rate, we ought to try to produce enough for our own requirements. We have tens of thousands of acres of good land producing next to nothing, and often covered with briers, affording a breeding ground for rabbits, instead of being utilised to grow food for man and beast and give profitable employment to many of our fellow colonists who are fighting against adverse conditions in the arid North.

Mr. KRICHAUFF having intimated that he wished to read a short paper upon a kindred subject, discussion upon the foregoing was deferred until he read the following upon "How can Intensive and Extensive Farming or Gardening yield a Profit?"—

This question was the subject of papers read by Dr. Buerstenbinder and Herr Guradze before the German Agricultural Society of Berlin, and, although not so suitable for us, there are some points in them which cannot be often enough placed before cultivators of the soil all over the world. These only I will recapitulate and a little add upon. 1. It is opposed to all common sense to try to work a greater acreage than that which is commensurate (a) to the number of the members of the family able to work, or of the farm servants, and (b) the amount of capital you have. 2. If you have to pay for the work to be done at the farm or garden, it would be absurd not first of all to make an exact calculation whether, after paying the wages, any profit can be expected from any crop. 3. It is unwise to grow a crop which cannot be marketed from your farm or garden except at an almost ruinous expense in money or time, on account of distance or the absence of railway communication. 4. To work thoroughly a smaller but good piece of land will in ninety-nine cases out of a hundred pay much better in the hands of an intelligent practical man than to have a large extent of land which your strength and capital cannot do justice to; and, worst of all, if perhaps heavy (or even low) rents are payable, or if money is owing on mortgage or bills. This last class, unfortunately, is a very large one in South Australia. Men thought that with the low rents demanded by the Government, or the low rate of interest now going, they might enlarge their holdings; but notwithstanding the low rent or interest, adverse seasons drive ever so many off the whole of their land. To raise money upon the old home for the purpose of enlarging the holding can only be justified if it is absolutely too small to employ all the members of the family on it, if the climate and situation are good, the rainfall always sufficient, and the price reasonable. (On the other hand, it is useless to waste perhaps the best years of life in working land which cannot possibly keep you and your family by being either too small, or that barren that all your work and the manure which you can find for it will never repay you for the loss of time and of capital. We may admire the pluck and indomitable energy of hundreds of farmers and others who have cleared their land of heavy scrub; but they have, unfortunately, not always been rewarded with ultimate success. Climate and rainfall had not been taken into calculation when they selected the land. Others have found trees or scrub growing on a soil which was grateful for all the work and the manure they could give it. I know farmers who took a lease of such scrub land from persons who purchased it for them, and knowing something of the nature of the soil, climate, and rainfall, these men were soon able to make it their freehold. Land hunger possessed them, however; they increased and again increased the size of their holding, and, after years of toil, they were worse off than at the commencement. That man who cleared last year at Enfield off 40 ft. square £10 would probably not clear £20 from 80 ft. square. The profit of a farmer will be in the same proportion: he may superintend and do all the work on 100 acres to his complete satisfaction, but with any large increase in the acreage he has to depend on others. He has all the risk of bad seasons, which are doubly severe after slovenly tillage, and even in a good season the profit (if any) is not like that from the first 100 acres. It is an undeniable experience of ever so many farmers who have more land under crop than they can cultivate carefully and in good time that crops without such attention, or too late, give only poor returns, and the latter require also more seed. It is also unlikely that you can get full crops from those that require hoeing, if the time and requisite labor cannot be found. Cultivation by the drill is also likely to be neglected, as it requires more time and labor than broadcasting, and the saving in seed is again lost. Another great objection against too large holdings is raised in Germany, in as much as they do not permit the carting of farmyard dung to fields far from the homestead without very great loss of time, and hinder therefore intense cultivation. This is of less importance here, as the quantity of farmyard dung is under any circumstances small, and artificial manures must take its place, or as Guradze says:—"I advise to use much more straw in stables (and stockyards), and to add to the manure phosphoric acid, potassic and magnesia salts." Of course, the better the climate the surer the rainfall, or an easy way of irrigation available, the more can intense cultivation be advocated. In our South-East this is in many places not nearly enough thought of—Mount Gambier and some other places, perhaps, excepted. Before the use of artificial manures in large quantities is, however, advisable in large districts of the South-East, the land must be drained, and, where the soil is sour from stagnant water, shallow ploughing is at first the best, but below the furrows the soil should be loosened by means of a grubber attached to the plough. After the fallow, lime, ashes, and marl can be used for sweetening the land. Being again ploughed and manured, better grasses and fodder plants will grow, and eventually cereals, carrots, and onions may be raised. Meanwhile, however, the breeding of cattle and sheep may be far more extensively carried on with advantage, and more so after we shall have succeeded in abolishing colonial boundaries. Fat stock must have paid well last season; and in this respect it is a great pity that we have not got a factory for beet sugar

at a central spot in the South-East, to which the railway could bring the beet and return the pulp, such part of the molasses as may be required for fattening cattle and sheep and the scum cakes as a manure. We might thus emulate some of the continental states and of the states of North America, in intense cultivation, fattening of stock, and increased dairy produce.

Intimately connected with intense farming is the use of fertilisers; and for us it is of great value to be informed of the results of experiments with wheat, which, in many instances, show a monetary loss, at least for the crop to which they were applied. In the April number of our journal you find the results of experiments made in South Australia, and these show, almost without exception, a better crop on the manured land, notwithstanding the drought. At all events, our cultivated lands were in need of fertilisers and yielded a profit. The following experiments, however, did not all come out with a profit, and less so where larger quantities of fertilisers were used. Some were made by Mr. Leesch, in Pomerania, upon mild loamy soil in "very good heart." Land not manured or limed gave 5,020lbs. of wheat per hectare (two and a half acres); all other blocks received 1,368lbs. of lime per hectare, and the one which only received lime produced 5,400lbs. With 392lbs. of nitrate of soda and 784lbs. of kainit added the crop was 5,530lbs.; with a further addition of 392lbs. of superphosphate the crop was 180lbs. less, viz., 5,350lbs.; by omitting the whole of the kainit he harvested only 161lbs. less; but when the superphosphate was supplanted by 588lbs. of Thomas phosphate the crop increased to 6,040lbs. of wheat. Three hundred and ninety-two pounds of superphosphate and 784lbs. of kainit yielded 5,230lbs. A complete manuring with farmyard dung on heavy clay soil yielded 5,500lbs.; while from another hectare manured with 2,400lbs. of kainit, 2,400lbs. of Thomas phosphate, and 400lbs. of nitrate of soda 5,640lbs. of wheat were obtained. Director Buhl, of Saargemünd in Lorraine, realised £4 0s. 1d. more per hectare, where he used 640lbs. of nitrate of soda and 270lbs. of muriate of potash, than without manure, but as the cost of the manure was £4 8s., there was a loss of 7s. 11d. The wheat harvested from manuring with 640lbs. of nitrate of soda and 1,200lbs. of Thomas phosphate sold for £4 8s. 6d., and yielded a profit of 4s. 6d. The crop of wheat manured with 1,200lbs. of Thomas phosphate and 270lbs. of muriate of potash sold for £4 2s. 2d., but as the cost was only £2 4s., there was a profit of £1 18s. 2d. Where he used the three fertilisers in the same quantities the crop was 1,240lbs. heavier than without manure, and sold at £10 16s. 1d., and as the cost of the fertilisers was only £5 8s., the profit was £5 8s. 1d.

Although no doubt phosphoric acid is specially wanted by most of our soils, such manuring with 480lbs. of Thomas phosphate, 108lbs. of muriate of potash, and 260lbs. of nitrate of soda, or an equivalent of superphosphate and sulphate of ammonia per acre, is not likely to be used so long as our farmers will not broadcast the fertilisers. Experiments will, however, doubtless show that a full crop will require not much less, and that such application will pay, provided the tillage is good, the land fairly clean, and the rainfall not too deficient.

There is not much danger in making mistakes with nitrogenous fertilisers applied in excess to oats and barley, and thus not realising a profit, so long as only reasonable quantities are used. Jacob Keller's experiments with oats in Germany show that he harvested 8½cwt. per acre more grain than from unmanured land and realised a net profit of £5, after using 240lbs. of kainit, 240lbs. of Thomas phosphate, and 180lbs. nitrate of soda. Where he left out the nitrate of soda he had only 3cwt. more, and a profit of £1 10s.; without the kainit he had 7½cwt. more, and a profit of £4 5s.; without the Thomas phosphate he had 6½cwt. more, and a profit of £3 8s. Many similar experiments confirm the above, and also that with 40lbs. more of nitrate of soda the net profit was much larger, while where no nitrogenous manure was given sometimes an actual loss occurred. Professor Dr. Wagner asserts that 100cwt. of nitrate of soda on an average produces 4cwt. of oats, but the dose should better be divided. Quite as much nitrogen is required by barley. P. Heddaeus manured loamy soil with 2cwt. 40lbs. of kainit and 2cwt. 40lbs. of Thomas' phosphate, on the 5th day of March, and added 40lbs. of nitrate of soda on the 9th of April and 40lbs. on the 4th of May. He harvested 7cwt. more barley per acre than where not manured, and made a net profit of £1 12s. per acre with barley at 3s. per bushel. In five other experiments the average was nearly 9cwt. more when increasing the nitrate of soda to 160lbs. and 220lbs., respectively. As a topdressing it should only be given when the plants are quite dry.

If we turn now to gardening the same caution should be used, and experiments with different fertilisers will soon show where a profit can be expected, and what and how much to use. On better soil kainit should not be used for vegetables. Use sulphate of potash or other potash manures. An indiscriminate application of stable dung or liquid manure to all crops is an idea which, I presume, has been pretty well exploded. The pea-flowering plants for instance, in obtaining their nitrogen from the air require no nitrogenous manure; but the necessary quantity of phosphoric acid is not nearly sufficient in any ordinary quantity of stable dung applied, and there is hardly any in the liquid manure. Mr. Freytag, of Roitz, found on equal plots that liquid manure alone, without an addition of a phosphoric acid manure, gave a comparatively poor crop of vegetables, viz., for cabbage, 46lbs. against 200lbs.; cucumbers, 32lbs. against 97lbs.; potatoes, 18lbs. 6ozs. against 36lbs.; tomatoes, 7½lbs. against 18lbs. The quantities of liquid manure and of a phosphatic manure are not mentioned,

Again, it should not be forgotten that although the nitrogen in stable dung is valuable, it is not at once available as plant food, and it does not therefore force the plants where an early crop is desired, like some commercial manures do—nitrate of soda and sulphate of ammonia. Professor Dr. Wagner says that 200cwt. of stable dung contains no more active nitrogen than the 46lbs. of nitrogen obtained from say 3cwt. of nitrate of soda, although the stable dung may contain perhaps 100lbs. or up to 160lbs. of nitrogen, of which frequently more than two-thirds requires a long time to decompose. The small quantity of phosphoric acid—from 4lbs. to 9lbs. in a ton of stable dung—can be supplemented by superphosphate for quick-growing crops, or in other cases by Thomas phosphate, bonemeal, and guano. Sulphate of potash has of the potash salts shown the best results for potatoes, tomatoes, lettuce, spinach, and onions (the latter like at least a ton of slaked lime per acre, or many tons of ashes; if you give sufficient nitrogen by means of old farmyard manure, or, much better, 150lbs. of nitrate of soda per acre, and also 100lbs. or more of Thomas phosphate, or else the same quantities of sulphate of ammonia and superphosphate or bonemeal. Experiments made by I. Foussat in France, on soil in good heart, in 1896, showed that nitrate of soda given to carrots in two doses gave a fine profit against no profit if manured with compost. While 200lbs. of it at a cost of 18s. per hectare yielded 119,000lbs., 400lbs. of it yielded 145,000lbs., and 600lbs. of it 149,000 lbs.; the profit over unmanured land was respectively £26 6s., £66 19s., and £73 12s. Similar results he had with red beets and white turnips, 600lbs. of nitrate of soda per hectare giving by far the best results. Six agricultural teachers in France were instructed to carry on further experiments with carrots in 1896. One hectare was in each case not manured, another received 4,000lbs. of Thomas phosphate, 400lbs. of sulphate of potash, and 400lbs. of nitrate of soda. In each case a net profit was realised from the manured land, in one case only £7 10s., the highest being £30 16s. 7d. In Germany the best manure for kohlrabi and for celeriac was per hectare 680lbs. of superphosphate, 600lbs. of sulphate of ammonia, and 600lbs. of muriate of potash. Where 3,600lbs. of wood ashes per hectare had been used with some little potash, and even less phosphoric acid, bleached celery was still better than where 388lbs. of nitrate of soda, 760lbs. of superphosphate, and 1,520lbs. of sulphate of potash had been used. But the best results were obtained in Rhode Island with 1,800lbs. superphosphate, 800lbs. of muriate of potash, 450lbs. of sulphate of magnesia, and 1,020lbs. of nitrate of soda per hectare, to which 15,300lbs. of slaked lime had been added. The largest head of cabbage with a correspondingly larger net profit were obtained in Germany by manuring a hectare with 100lbs. of concentrated superphosphate, 1,032lbs. of nitrate of soda, and 738lbs. of sulphate of potassium, and magnesium of 27.1 per cent. The agricultural teachers in France tried only the following manures for cabbages, viz., 4,000lbs. of Thomas phosphate, 400lbs. of sulphate of potash, and 400lbs. of nitrate of soda per hectare against unmanured hectares and had in each case substantial net profits. In experiments with rhubarb on plots, measuring 38yds. by 11yds., E. Lierke of Leopoldshall, Germany, found that the variety "Queen Victoria" during two years, 1896-7, did specially well when treated as follows:—Dung was applied as indispensable for ameliorating the condition of the soil with organic matter: but only a small quantity of the nitrogen in it so much required by rhubarb could act. To six of his seven manured plots he applied therefore 265lbs. of sulphate of ammonia and 178lbs. of nitrate of soda and to all the plots 303lbs. of superphosphate of 16.3 per cent., and where he added 268lbs. of sulphate of potash the average weight of the stalks of two plants was 21lbs. in 1896 and 33.4lbs. in 1897. An average of three plots that had received the four fertilisers gave 3,645lbs. more in 1896-7 than from the unmanured, and a net profit of £4 6s. 6d. per acre. Professor Wagner just now published the following in trying to induce intense cultivation notwithstanding the low prices of produce:—"The profit made from using commercial manures has been satisfactory, frequently a high one. The largest profit has always been obtained from 'full manuring,' consisting of a proportionate quantity of nitrogen, potash, and phosphoric acid. If nitrogen was omitted the profit fell considerably, and sometimes a loss was incurred; and in omitting phosphoric acid and potash the profits generally fall off very much. The average of seven fields of oats changed from 32cwt. to 60cwt. per hectare with an increased profit of £7 18s. when fully manured. The average of five fields of barley increased from 38cwt. to 54cwt. per hectare with a profit of £4 10s., and the average of nine fields with seeding turnips increased from 80cwt. to 1,502cwt."

As the morning session was now so far advanced the discussion upon the two preceding papers was necessarily very short, and nothing of particular moment was advanced. Members adjourned for lunch, and soon afterwards walked over to the

Typical Orchard,

where Mr. M. Holtze, F.L.S., &c., Director of the Adelaide Botanic Garden, received them, and showed what work had already been done. A considerable number of correctly-named fruit trees and fruit-bearing plants have been

obtained from various extra-colonial and foreign sources, and nearly all of them give promise of succeeding well under his care. As this is the first season of operations, very little more could be said or written upon this subject.

For the afternoon session the Chairman called upon Mr. George Quinn to address the members, as follows, upon "The Type of Fruit Tree Suitable to South Australian Conditions":—

The adoption of an appropriate type or form of training plants of economic value has apparently been only attained by a slow evolutionary process in all civilized countries. Certainly one country when taking up a new industry may adopt methods in vogue in some other country, but where the general conditions, both natural and artificial vary greatly it will be difficult to find any record of great success being obtained by copying and following strictly upon the lines pursued under different conditions.

The conditions which have been chiefly instrumental in formulating these adopted types may be set down as range of temperature, sources of moisture, qualities of soils, shelters from violent atmospheric disturbances, ravages of insect or other diseases, and cost of labor.

In the cultivation of fruit trees the ultimate object sought may be summed up as "The production of the largest quantities of first-class fruits at the lowest possible cost," and in the evolutionary process referred to only those portions of any method tried which tally with this principle are retained, and stand the test of practical every day work. In most of those districts in South Australia where fruit is produced on a commercial scale the soils are fairly fertile; the absence of extremes of heat and cold are favorable to the development of an exceedingly wide range of fruits. The deficient supply of moisture is often of greater concern, and shelter from rough winds is very necessary. The equable temperatures referred to above are particularly conducive to the wellbeing of a number of diseases, and the high cost of labor often seems out of proportion to the small prices received for fruit.

To sum the matter up briefly, we may say—Nature has given us a kindly soil, a mild winter, but a summer which leans somewhat to excessive dryness. We live in a portion of this continent where the natural features do not readily check the rush of accumulating wind-forces; climatic conditions render our trees very liable to plant pests; and the cost of living being high, labor is necessarily dear. Now, following on these premises, in working out our suitable type of fruit tree we must have one which allows us to conserve moisture, by permitting thorough cultivation—one that does not offer a great obstruction to strong winds; and, while it is calculated to bear these certain buffetings, sustain the least possible damage. It must also be of a size and shape which will permit the grower to apply preventive treatments for diseases; and to save time, which means money in harvesting, and pruning, as well as in every other phase of orchard work, we must have a tree that can be quickly, thoroughly, and easily manipulated in every respect. In my opinion the type which will be found most appropriate for our requirements will be a short-stemmed, rigid, vase-shaped tree, upon which fruit spurs will be borne from the trunk upwards.

Mr. QUINN then explained and demonstrated the method of pruning to be followed in the formation of this type of tree from its transplantation into the orchard to the time of bearing, and then demonstrated further the treatment of the fruiting wood of the various kinds of fruit trees.

The remainder of the address being upon similar lines to that delivered by Mr. Quinn at the Congress of Bureau held in Adelaide in September and published in our October issue of the *Journal of Agriculture and Industry* we suggest to our readers to read the two papers together, as space does not permit the republication of the whole matter.

Mr. Quinn, by aid of a blackboard, illustrated each particular point of his address in a most interesting and instructive manner.

In the discussion which followed the question was asked by Mr. Monks—"If summer pruning as advocated by the lecturer would tend to make trees bear more regular crops, would it correct the peculiarity of some trees to bear a heavy crop one season and none the next?" Mr. W. C. GRASBY said it would correct the habit very greatly, especially if the trees were operated upon from the very beginning. Mr. LAFFER said he thought if the fruits were thinned from a fair proportion of the spurs those resting one season would in all probability carry fruit the following season, and instanced the Scarlet Nonpareil as a variety which bore alternate years. He therefore concluded that the irregular habit could be corrected considerably by thinning out the fruits. He had practised thinning the spurs by shortening in the branches

upon which they were carried, and during the last few seasons he had not had such variation in his crops as formerly. Last season, when nearly all gardens carried a very small crop of apples, he had taken a moderate crop from his trees. [Mr. Quinn has since informed me that Professor Bailey in his book on pruning, just issued from the press, gives the results of his observations on this point, which have extended over many years. Professor Bailey says the irregular habit no doubt arises from the fact that the spur or spurs which spring from near the base of the fruit-stalk of a fruit that is matured do not usually receive sufficient nourishment—the fruit having first chance—to enable such growths to properly mature the flower buds for the next season; but other reasons are apparent, such as the freeness of soils and food supplies to the roots. The Professor says that either removing the fruits when set, or the removal of some of the spurs by pruning, would regulate the crops considerably. He suggests that possibly, in orchard practice, it would be better to remove the whole of the fruits from some of the alternate bearing sorts, and thus change the fruiting season of some and distribute the crops evenly over a series of years.—GEN. SEC.]

Farming in General.

The Chairman next called upon Mr. A. Harper (Clarendon Branch) to read his paper on "Farming in General."

Having been a farmer all his life, he proposed to give a few hints gained from his long experience. Farmers often make mistakes by trusting to one or two items of produce—perhaps wheat or hay—instead of producing as many articles as is possible; then, if one should fail to be profitable, some of the others would compensate for the failure. He would grow hay, wheat, peas, green feed, potatoes, grass, have some fallowed land, keep some sheep, a few cows, pigs, poultry, breed some cattle, horses, &c., both for himself, and some (if possible) for sale. He would try to produce milk, butter, cheese, eggs, poultry, mutton, beef, pork, &c., not only for supply of his own home, but have some for sale, to bring in ready money for purchase of articles needed at home or on the farm. Sheep would keep the land clean, provide a clip of wool, and would rear some lambs for the market. The breed of horses favored by him would be light, strong, and active. If any product brings in a high price this year it is generally good practice to put in only a small area next season, because a great many people will be tempted to do the reverse, and thus prices will be much reduced. In order to grow good crops the land must be well worked, and must return in the shape of fertilisers an equivalent for what we have removed from the soil in crops, else disappointment will follow. Under present conditions good bonedust is best when sufficient farmyard manure cannot be procured. The farm should be divided into small paddocks—say fifteen to twenty acres; then some can be cropped, some used for grazing, and others can be laid in fallow. Regarding seeding, some farmers advocate 20lbs seed per acre, some 30lbs., and some 45lbs., but a full bushel (60lbs.) is little enough. If we do not put it on we cannot get it off. Of peas, not less than 3bush. per acre should be sown; then manure well with farmyard, or else use bonedust. For potatoes plough up about 4in. deep in June, harrow down, and then let it lie until time for planting then plough 8in. or 9in. deep, which will give plenty of mould to work upon. Good implements and machinery of all kinds are essential to good farming, and these must be well cared for and sheltered when not in use, else the weather will injure them more than all the work.

There was a short discussion upon this paper, chiefly upon the quantity of seed wheat that might be profitably sown upon an acre. Generally it was contended that quite a large proportion of stripped grain is cracked and will not germinate, but where the seed has been reaped and thrashed separately a much lesser quantity might be sown.

There was no time to discuss the subject undertaken by the Cherry Gardens Branch upon "What benefit do members receive from attending these conferences?" and members adjourned for tea.

Insect Pests.

In the evening session Mr. W. C. Grasby gave an address upon "Insect Pests," illustrated with lantern slides, which were well received and much appreciated by the members and visitors.

CENTRAL AGRICULTURAL BUREAU.

MONDAY, OCTOBER 24.

Present—Messrs. F. E. H. W. Krichauff (Chairman), S. Goode, W. C. Grasby, H. Kelly, T. B. Robson, T. Price, M.P., C. J. Valentine, and A. Molineux (Secretary).

Branch at Meningie.

The formation of a Branch at Meningie was approved, with the following gentlemen as members:—Messrs. M. Linn, J. Williams, R. M. Scott, H. B. Hacket, T. W. R. Hiscock, C. J. Shipway, F. E. Hyde, J. F. Dodd, A. Linn, W. Tiller, W. Trosser, and W. J. Botten.

Potatoes.

Some discussion took place on planting potatoes, and Mr. Grasby stated that in some experiments he was carrying out he cut thirty-five varieties to single eyes mostly, making 480 sets, and of these only one had missed.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

241. *Dr. Tancrè's Remarks on Nitratin.*—From a long article I take the following:—Without any interference on the part of man a considerable transfer of bacteria occurs that live on the roots of those legumens which are most cultivated in the locality. This large uninterrupted natural vaccination of the soil with bacteria through the movements of the air makes clear the preponderating inefficacy of inoculation with nitratin in such localities where the particular legumes had been cultivated for some time with success. But in large heaths and moors, lately taken into cultivation, inoculation with nitratin has been of surprising efficacy. Of thirty experiments made in Schleswig-Holstein, three only were successful, and those were on moors and poor sand. On five-sixteenths of an acre the proportion of beans harvested was as 500lbs. to 700lbs. Until the present preparation of nitratin be improved, and with the difficulty to protect it from the sun, and the short time for which it remains as yet effectual, its application, even where useful, is rather impeded. Scientifically nitratin has, however, made good its efficacy under certain conditions; but the same cannot yet be said of alinit.

242. *The Use of Lime.*—It exerts a fourfold influence on the soil, viz.:—1. It supplies calcium, one of the ten elements which are valuable to plants. 2. It acts upon the organic matter of the soil by neutralising the sour organic acids. 3. It unlocks the stores of inert mineral matter as potash and soda, and makes these available as plant food. 4. Stiff soils can be better tilled, their texture becoming mellower and more friable. Lime also destroys insects, and greatly improves pastures. From 1 ton to 2 tons of lime per acre is an average dressing; more of it of course on stiff soils. Burnt lime, or quicklime, is mostly used, and the fresher the better. It loses by the burning 44 parts of carbonic acid, and keeps 56 parts of lime; but in the soil it attracts again by degrees carbonic acid out of the air and soil. You can use lime together with farmyard dung if you wish to see the manure quickly changed into plant food, and especially is this the case with kainit. Thomas phosphate, nitrate of soda, and other potash salts and raw phosphates can also be used at the same time, but not sulphate of ammonia, guano, blood manure, and superphosphate, which should be put on somewhat later. Lime destroys sorrel most effectually.

243. *Ploughing by Steam v. Horses.*—A steam plough turns over per day from ten acres to twelve acres, and, if desired, at greater depth than our single or multiple ploughs can do with not more than two horses. According to a discussion at the Farmers' Club, at Berlin, every person present admitted the great superiority of the work of Fowler's plough and Borsig's plough over that by horses. The cost per morgen (about half an acre) was stated—according to the soil and the number of men employed—at from M.3'5 to M.4'80 (3s. to 4s. 8d.). Councillor Summerfeldt has saved £1,500 a year since he has used steam ploughs. In one case the steam plough had brought so many stones to the surface that the sale of them paid for the plough, which, however, thereafter did not make as good work again as others. For smaller farmers co-operation in the purchase of a steam plough has been found a saving also. The necessary capital was under £3,500, and 2,500 morgen could be ploughed with it in the season.

244. *Milk Champagnised*.—Mr. Cossins has patented a new sterilising process for all fermenting liquids. These are put in a closed vessel and are subjected to a stream of oxygen proportionate to the quantity of the liquid. Milk can thus be kept for any length of time. But to make champagne milk, which also keeps any length of time, and is a most delicious and refreshing drink, sugar and an aromatic essence are added to the milk, which receives also a quantity of carbonic acid gas in a closed vessel.

245. *Teddering Cows*.—This is being carried on in Schleswig-Holstein of late after the Danish fashion, it being acknowledged that while a cow requires 55·16ar. (rather less than half an acre) on fairly good pasture, she will be as well fed on 41·37ar. when teddered. There is also the further advantage that the grass has a better chance of recovery during an interval of four to six weeks than being constantly under pasture and trodden upon. It has also been observed that the cows lose much milk when they are let loose.

246. *Glossy Butter* is now frequently met with in England, and is prepared as follows:—After the butter has been in a refrigerating chamber you dissolve a spoonful of white sugar in a little water, and after heating the solution you paint it with a brush over the butter, which you have laid on a clean cloth. It looks now as if glazed, and the air being thus excluded it keeps much longer fresh. The taste is much liked by the consumers, especially children.

247. *The Diseases of Potatoes*.—Professor Dr. I. C. Weiss, of Freising, says, in an article, that formerly only two diseases were distinguished, viz., the dry rot (*Phytophthora infestans*) and the wet rot, which was the action of bacterium named *Clostridium cutyricum*. Lately scientific research distinguishes the origin of these diseases in six different forms, of which five are caused by fungi and the other by very small wormlets, a nematode named *Tylenchus devastatrix*, which is also observed to feast on other cultivated plants. Of these rots are the following noted:—1. A thread-like fungus (*Fadenpilz*) *Rhizoctonia solani* is easily recognised, as the tuber quickly becomes soft and watery, and the inside of it is grey and transparent. The starch in the cells dissolves and the tuber shows wet rot. This fungus does no harm so long as it is outside on the skin, but enters probably through small cuts and bruises, or perhaps through the respiratory organs (lenticelles). 2. Another form of rot is again a threadlike fungus (*Phellomyces*) living on the skin of the potato in its harmless form, but if too luxuriant penetrates into the interior of the tubers and browns those parts without an alteration of the starch, but the cells become unconnected, and later on the parts infected become soft and whitish. This disease may spread from the seed potato. 3. Another threadlike fungus (*Fusarium solani*) appears mainly on quite rotten potatoes during the storage in the form of white pustules and eruptions on the skin of dry-rotted tubers, but this dry rot can also be created through the *Fusarium*, as little is as yet known of its activity. 4. The rot through bacteria (*Clostridium*) shows very small and short bars of a fungus within the cells, by which the starch is not substantially altered, but the walls of the cells are loosened. As long as sufficient sap is in the cells a wet rot is the consequence, which alters gradually into a dry, pulvery mass. The bacteria enter through cuts or the lenticells, or where other diseases have already damaged the skin. 5. The rot caused by nematodes (*Tylenchus*) browns the attacked cells. 6. The fungus *Phytophthora* is by far the most destructive. It attacks not only the leaves, which it blackens and dries up, and thus prevents the tubers from becoming full grown, but it shows also on the tubers themselves as well in the ground as when stored. This disease is contagious, for any infected tuber coming in contact with others will transmit it. *Phytophthora* appear far more in a wet season, and less in light sandy soil open to the sun and wind. The storage should be dry or the disease will spread, and only sound, perfect, and uninjured tubers should be planted. Any infected tubers must not be left in the field, and a rotation of crops is certainly advisable. New sorts of potatoes are as a rule less subject to the disease, and the delicate white varieties are more subject to rot than the thick-skinned red. *Magnum bonum*, *Sutton*, and others not known here are named as most resistant. As a remedy the Bordeaux mixture is generally used against the appearance of the disease on the leaves, and Professor Frank recommends also treating the seed potatoes with it as having been found very effectual by him. About eight weeks before planting he places sound potatoes for twenty-four hours into a 2 per cent. to 4 per cent. Bordeaux mixture, and washes afterwards the tubers to prevent the buds being injured by the bluestone. Another advice is not to plant any withered or soft tubers or which show inside spots or hollows.

248. *Rapid Increase of Bacteria in Milk*.—Freudenreich found in a cubic centimetre shortly after milking, 9,000 bacteria; after an hour at 15° C. their number was 31,750; after nine hours, 120,000; after twenty-five hours, 5,000,000. In a temperature of 35° C. the bacteria increased after nine hours to 3,400,000, and after twenty-four hours to 812,500,000. *Sacharbakoff* found in one cubic centimetre of milk selling in St. Petersburg 115,300,000 micro-organisms. In a temperature of under 10° C. or over 40° C. bacteria increase slowly, and with a higher or lower temperature there is no increase at all.

249. *Manuring for Carrots*.—Professor Dr. Paul Wagner, after seven experiments, gives the following list as the proportionate value of the several nitrogenous manures as applied to them, and states that with potash and with marl a further increase of the crop is to be recorded. If

the nitrogen in nitrate of soda is like 100, sulphate of ammonia is 90, blood manure and green matter from plants 70, steamed fine bonemeal 60, stable manure 45. Mons. I. Foussat found in France that, in calculating the cost of manuring, compost gave no profit, while with the increase of nitrate of soda from 200lbs. to 400lbs. and 600lbs. per hectare (2½ acres), the profit also was much greater, but proportionately not so pronounced where more than 400lbs. were applied. The French agricultural teachers were instructed to use 4,000lbs. of Thomas phosphate, 400lbs. of sulphate of potash, and 400lbs. of nitrate of soda per hectare, and the net profits were £7 10s., £30 13s. 7d., and £44 12s. respectively.

250. *Potatoes* have lately commanded a good price, and a topdressing with 2cwt. per acre of nitrate of soda applied at the time of their appearing above ground will probably pay well. This is recommended by ever so many farmers in Germany, together with using a very light harrow.

New Wheats.

Mr. R. Marshall, of Hope Farm, Templers, invited members to inspect his plots of new wheats. It was decided to make an inspection early in November.

Standard Weight of Chaff.

The Minister of Agriculture intimated that the resolutions passed at the Tenth Annual Congress of the Bureau *re* the adoption of a standard legal weight for chaff must stand over for the present.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Yankalilla, Dr. A. J. Meikle; Strathalbyn, Mr. P. Cockburn; Quorn, Messrs. W. Toll, J. Johnson, H. S. Stacey, and H. Cown; Davenport, Mr. Alexander McDonald; Caltowie, Mr. J. A. Leahy; Burra, Mr. W. G. Hawkes; Mount Remarkable, Mr. J. B. Morrell; Woolundunga, Mr. J. Greig; Penola, Messrs. E. McBain and J. T. Morris; Albert, Mr. R. C. Rasmussen; Murray Bridge, Messrs. T. Heinrich and H. Schubert.

Reports by Branches.

The Secretary reported receipt, since previous meeting, of seventy-six reports of Branch meetings.

REPORTS BY BRANCHES.

Yorketown, September 3.

Present—Messrs. A. Jung (in chair), J. Latty, C. Domaschenz, and J. Davey (Hon. Sec.).

FERTILISERS.—Some discussion took place on alleged attempts to sell gypsum, treated in some manner, as a phosphatic manure, and members thought farmers should be very cautious about using any if offered for sale.

UNDERGROUND GRUBS.—Members report these are still doing a lot of damage to crops and grass.

Quorn, September 24.

Present—Messrs. R. Thompson (Chairman), J. B. Rowe, F. Herde, C. Patten, James Cook, G. Altmann, G. Baker, and A. F. Noll (Hon. Sec.).

SOURSOPS.—Members reported that this weed was not prevalent in the district.

CONGRESS.—The Hon. Secretary gave a short report on the proceedings of the recent Congress. Members were of opinion that steps should be taken to prevent overcrowding at the annual visit to the Roseworthy College.

Port Elliot, September 24.

Present—Messrs. C. H. Hussey (Chairman), J. McLeod, H. Green, P. O. Hutchinson, W. E. Hargreaves, H. Pannell, and E. J. Hill (Hon. Sec.).

DAIRYING.—Mr. J. Davidson's offer to deliver a lecture on this subject was accepted.

CONSERVATION OF FODDER.—Mr. Hutchinson read paper on this subject as read at Tenth Congress, and considerable discussion ensued, opinions varying as to methods and machines to use in conserving fodder. It was conceded that a great deal must necessarily be left to the individual judgment of those concerned.

Amyton, August 25.

Present—Messrs. John Kelly (Chairman), Thomas Gum, H. Turner, James Burley, James Gray, A. Stone, and S. Thomas (Hon. Sec.).

ERRATUM.—In September issue, page 156, paper on "Fruit and Ornamental Tree Planting" was credited to Mr. Thomas by mistake, Mr. H. Turner being the reader.

SOURSOPS.—This weed is growing in the district, but does not give any trouble.

SHEEP.—Mr. Kelly read a paper on "General Cultivation." He strongly recommended the keeping of sheep to clean the land and bring in some ready money, besides providing meat for the household. Last year he purchased 100 sheep at 6s. 6d. After utilising them as cleaners, he got enough from the sale of the wool, skins, &c., and thirty-seven head to pay for the whole lot; in other words, he had meat for his family for fourteen months free of cost.

Caltowie, September 26.

Present—Messrs. G. Lehmann (Chairman), A. McDonald, J. Noonan, J. Potter, P. O'Loughlin, J. Neate, G. Petatz, D. Wilson, and R. Walsh (Hon. Sec.).

HAY.—Considerable discussion took place on best time to cut hay. Members agreed that for home use the crop should be cut just when the bloom is off, as stock do much better on it then than if riper. For selling they would, however, leave it a little later. Mr. Petatz said he found a little salt added when stacking self-sown hay greatly improved it, and made it more palatable to stock.

WEEDS.—Several weeds were tabled for identification, and it was suggested that as they were spreading rapidly the Central Bureau should be asked to endeavor to have them proclaimed as noxious weeds.

Tanunda, September 29.

Present—Messrs. J. H. Walden (Chairman), W. Graetz, G. Mann, J. Basedow, T. Brock, A. Ohlmeyer, C. Heinemann, and E. Trimmer (Hon. Sec.).

EXHIBITS.—By the Hon. Secretary—Some fine white carrots, raised from seed sent him by Central Bureau. By Mr. W. Graetz—Some door mats, made from white binder twine. These were greatly admired.

THE PEACH.—Mr. A. B. Robin read the following paper:—

The peach, although perhaps of less importance to the commercial grower, is, during its season, the most popular of our dessert fruits, and deservedly so. A well-grown luscious peach is pleasing to both the eye and palate, as well as refreshing to the system, whilst its medicinal

and tonic properties rank next to those of the apple. To cultivate peaches successfully, more skill and careful attention is required than with any other kind of fruit tree. Although the soil and climate of this district, and other parts of South Australia, are favorable to the production of peaches of the highest quality, the tree is often short lived, or becomes unprofitable at an early age. The principal causes for this are neglect or improper management.

Soil: The best soils for the peach are good sandy loams, especially when overlying red clay or marl, and also deep alluvial, provided it is not too retentive of moisture. Stiff clays or badly-drained soils are unsuitable. The yellow varieties especially require a rich moist soil.

Stock: In localities best suited for peach-growing the peach seedling only should be used. On dry limestone soils, however, the hard shell almond stock gives better results. On the other hand, the mussel and American plum stock are often used with advantage on wet land. The soft shell almond should be strictly avoided.

Distance to Plant: The trees will have sufficient room to develop if planted 20ft. apart.

Forming the Tree.

A. Pruning: During the first two or three years the system of pruning is somewhat similar to that of other trees. Trees of one year's growth should be chosen, cut down to about 1ft. from the ground. Allow three or four shoots to grow, which, during the following winter, must be shortened to half their length. The pruning should be gradually increased as the trees come into bearing. During the first two summers all superfluous shoots should be suppressed.

B. Pruning Trees in Bearing: It is impossible to lay down any hard and fast rules for pruning the peach, as our methods must be modified according to the variety, position of fruit buds, season, &c. The peach bears its crop on wood of the previous year's growth, which must be cut well back to provide vigorous shoots for next year's crop, to prevent an excessive quantity of fruit setting, and to force out the lower buds. The peach has a great tendency to form new wood only at the ends of the branches and laterals, and unless these are shortened considerably the lower buds remain dormant, and cannot be excited into growth in subsequent seasons; consequently the lower branches gradually become bare until the tree presents the appearance of a skeleton, bearing its crop of inferior fruit only at the extremities. It should be the object of every pruner to keep the lower parts of the tree covered with bearing wood and foliage. In the heavy-bearing kinds, such as the Royal George, both fruit and wood buds are formed along the whole length of the shoots. The treatment of these is comparatively simple. The main branches should be cut back to about 4in., and all laterals to two buds. The wood should be well thinned out, to admit plenty of light and air. In other varieties, such as the Early Crawford, the fruit buds are borne on the upper ends of the branches. With these the pruning should be less severe, or else some of the weaker and more horizontal branches may be left long for fruit and afterwards removed; but where the growth is vigorous and time can be spared summer pruning, which will cause fruit buds to form near the base, will give the most satisfactory result. With the laterals and weak fruit shoots the rod and spur system may be adopted, i.e., cutting back to two buds, which will produce two shoots the following winter—one of these is left to bear, and afterwards suppressed; the other is cut back as before, to make wood. It is advisable to defer pruning until late in the winter, as it is easier then to distinguish the buds, and this applies specially to such kinds as Briggs' Red May, which have a tendency to cast their buds during winter.

Thinning: This is often a necessary adjunct of pruning. Every peach should have sufficient room to develop properly. A great deal must be left to the judgment of the grower. Thinning may be commenced about the end of October, when the imperfect fruit begins to drop and the danger of spring frosts is over. Thinning not only increases the size and quality of the fruit, but ensures more regular crops.

Irrigation: This is not necessary in our district, in fact, irrigated fruit is less suitable for canning, drying, and transport. On the sandy soil at Nuriootpa peaches weighing over 17ozs. have been grown without irrigation in the driest seasons.

Fertilisers: Wood ashes are an excellent fertiliser for the peach, potash being the most important constituent. Refuse from the wineries and distilleries also give excellent results.

Diseases (Local).

Curl Leaf: This is a fungoid disease, favored by sudden changes during spring. It may be prevented very easily by spraying once with Bordeaux mixture just before the buds open.

2. Black Aphis: This is frequently a source of much trouble and expense. Constant spraying with insecticides is necessary until their natural enemies (the ladybirds) appear, when spraying should be discontinued, as it may do more harm than good. The most effective remedy I have tried is the nicotine sheep-dip, used at the rate of 1pt. to 40galls. Another common insecticide is a boiled decoction of tobacco and soap, in the following proportions:—One ounce tobacco, or 2ozs. tobacco waste, 2ozs. soap, 1gall. water. In Victoria the kerosene amalgamator is used very successfully, and it seems far superior in every way to the kerosene emulsion. To destroy aphis on the roots about 1gall. of tobacco wash or sulphate of iron solution should be poured in a shallow basin in the soil round the stem.

3. **Gumming:** Very little appears to be known about this disease. Vigorous young trees are often injured by the gum exuding from the buds. It appears to be induced by excessive moisture in the soil, especially after a spell of drought. A slit cut in the bark of the stem, to allow the gum to escape, will generally give relief.

4. **Peach Rust** (*Puccinia prunii*): This disease, which also attacks the plum, has not so far proved very serious. It does not develop, except in very wet seasons. Red spots appear on the leaves, gradually extending, and under favorable conditions the fruit also becomes spotted and deformed. The only known remedy is to spray the trees with very weak Bordeaux mixture during summer.

Varieties: These are innumerable, and are constantly being improved upon, for market or home use. A list of the best varieties for successive cropping was published in the June number of the *Journal of Agriculture*. For canning and drying the following sorts are most suitable:—Early Crawford, Foster, Muir, Elberta, Lady Palmerston, and Salway.

Discussion postponed until next meeting.

Lipson, September 24.

Present—Messrs. S. F. Potter (Chairman), F. W. Darling, H. Brougham, H. Gale, Chas. Provis, G. Provis, E. J. Barrand (Hon. Sec.), and three visitors.

MACHINE OILS.—In answer to a question the Chairman said he found castor oil the best for strippers and colza oil the best for reaping and mowing machines.

HORSE COMPLAINT.—Mr Provis stated that one of his horses was suffering from a very irritating scurf on the shoulders, which he had been unable to get rid of.

WHEAT-GROWING.—Considerable discussion took place on manuring of cereals, red rust, &c. Mr. Gale expressed the opinion that farmers often use commercial manures too sparingly, and that in a dry district it would be better to use it more liberally and force the crop to maturity earlier in the season.

Nantawarra, September 26.

Present—Messrs. C. Belling (Chairman), S. Sleep, J. W. Dall, E. J. Herbert, J. Nicholls, R. Nicholls, and T. Dixon (Hon. Sec.).

SOURSOFS.—Only one member had seen this weed in the district, and these were in the soil round the roots of fruit trees. All the bulbs were carefully destroyed. Members seem to be of opinion that this district is too dry for this weed ever to become a nuisance.

CONGRESS.—Mr. Dall reported on proceedings of recent Congress and on a visit to the Port Adelaide Freezing Works. Considerable discussion on the forthcoming trial of harvesting implements took place.

Renmark, September 27.

Present—Messrs. S. R. Cox (in chair), M. Chapman, F. J. Burrill, H. Showell, W. H. Harrison, R. V. Bostock, W. H. Waters, R. Kelly, H. Swiney, and E. Taylor (Hon. Sec.).

TORNADO.—Considerable discussion took place on the damage done by the tornado which swept over the settlement a few weeks since. Members stated that along the track of the tornado the crops would practically be failures, all the blossoms having been torn off. Mr. Cox said the apricot trees had in many cases been seriously injured by the hailstones, and asked whether the injuries were likely to be permanent. Mr. Harrison thought not—the trees would probably recover before next season.

WEEDS.—Mr. Chapman said the wild mustard was very troublesome to him, and he found it very difficult to exterminate.

SWEET POTATOES.—Mr. Harrison distributed tubers of sweet potatoes, some exceeding 6lbs. in weight. He had had good returns from setts planted 3ft. apart in rows 8ft. apart. The setts should be planted 4in. deep, the land kept thoroughly cultivated and free from weeds, and not allowed to become dry.

Naracoorte, September 17.

Present—Messrs. S. Schinckel (in chair), G. Greenham, J. Wynes, H. Buck, and G. C. Bates.

SOURSOPS.—Members reported that this weed existed in small patches in many parts of the district.

FEED TROUGH.—Mr. Buck showed model of horse-feed box, the particular advantage claimed being that the overlapping edges round the box prevented wasting the feed.

DAIRYING.—Considerable discussion took place on the conditions upon which the Department of Agriculture loaned to the Branches the bulls purchased by it.

Mount Remarkable, September 20.

Present—Messrs. H. B. Ewens (Chairman), A. Mitchell, S. Challenger, W. Girdham, G. Yates, W. Lang, C. E. Georgensen, T. P. Yates, T. H. Casley (Hon. Sec.), and one visitor.

CONGRESS.—Mr. Mitchell (delegate) reported upon each item considered at the recent Congress of Agricultural Bureau.

LECTURE.—A committee was appointed to arrange for hearing a public lecture on "Wool-classing," offered by Mr. G. Jeffrey.

Golden Grove, September 20.

Present—Messrs. T. G. McPharlin (Chairman), J. McEwin, J. Ross, H. Bowey, A. Roberts, W. J. Rehn, D. Smyth, A. Robertson, and A. Harper (Hon. Sec.).

SOURSOPS.—It was generally conceded that there are many worse weeds than *Oxalis cernua*, and that it would be impossible to exterminate it in any locality where it has got an extensive hold, though on small patches it may be killed by covering with straw or bags, or by enclosing pigs or poultry on it.

Forster, September 26.

Present—Messrs. A. Johns (Chairman), J. Retallack, J. Sears, C. Bolt, J. R. Bolt, H. Fidge, F. Johns, J. Johns, J. Prosser, W. H. Bennett (Hon. Sec.), and six visitors.

EXHIBITS.—Mr. Retallack tabled some very large turnips, grown from seeds sent out by the Central Bureau, and reported that frost had killed his peas.

DAIRYING.—Several members spoke of the advantage of preventing access of colder air than exists within the dairy room, and mentioned methods of keeping dust out of the milk dishes. One member advocated the use of the cream separator.

WATER CONSERVATION.—Mr. J. Sears read a paper, in which he proposed several methods of storing or providing supplies of water. The first was to erect all buildings with galvanized iron for roofs. Eighty sheets of 9ft.

galvanized iron would give a surface capable of catching about 740galls. from lin. of rainfall, or 1,110galls. on 1½in. Another way is to build cement tanks and prepare a catchment area by means of lime ash [or quicklime on a pulverised surface, levelled, watered, harrowed, and rolled.—GEN. SEC.] This should be fenced around to keep animals off. He estimated cost of bricks for a tank to hold 226,635galls. at about £20. To raise water from the river to the top of the cliff, for a small supply, he suggested an aerial wire railway and bucket. For rather larger quantities he thought windmills would be best. A good windmill, with favoring wind, would pump 5,000galls. in twenty-four hours. A 3½h.p. oil engine, with Evan's pump, would lift 1,000galls. per hour. Up to 200ft. lift it would, he thought, be most economical to use wind power; but an oil or other engine would be best when the water needs to be lifted more than 200ft. The cost of a Crossley 4h.p. oil engine would be about £80; Campbell's 3½h.p., £92; Implement Company's, £100; Howard's 4h.p., £140. This last engine is estimated to cost 3d. per horsepower per hour to work.

Penola, October 1.

Present—Captain Fowler (Chairman), Dr F. Ockley, Messrs. W. Miller, D. Balnaves, L. W. Peake, J. W. Sandiford, J. A. Riddoch, S. B. Worthington, D. McKay, H. Ricketts, E. A. Stoney, and T. H. Artaud (Hon. Sec.).

OFFICERS.—Mr. T. H. Artaud was reappointed Hon. Secretary.

CONGRESS.—Dr. Ockley reported, as delegate. He thought these Congresses of Branches in Adelaide were causing greater interest every year. Mr. L. W. Peake directed attention to Professor W. Lowrie's address upon "Agricultural Societies," and it was decided to discuss the matter at next meeting.

RAINFALL.—By Hon. Secretary—August, 2·57in.; September, 2·86in. The total for 1898, to date, was 19·27½in. For 1897, for same period, 18·63in.

NARACOORTE FOREST RESERVE.—In discussing the subject of the letting on lease of this reserve it was mentioned that, although it is not allowed to burn the rank grass, fires usually occur, and several valuable trees are destroyed each time. Mr. D. McKay said that pines should be planted on portions of the reserve, as they grew very well a mile or two away.

Woolundunga, September 21.

Present—Messrs. G. Lewis, T. H. Prosser, F. A. Sells, J. Grunike, N. J. S. Rogers, W. McLean, and N. Rogers (Hon. Sec.).

HOMESTEAD MEETING.—The members met at the Hon. Secretary's homestead, "Stratton Park," and, after inspecting the garden and grounds, had tea.

Stansbury, October 1.

Present—Messrs. Alex. Anderson (Chairman), J. Henderson, P. Anderson, P. Cornish, J. Antonio, and C. Anderson.

WEED.—Mr. Antonio brought in specimen of a plant which had sprung up in great abundance in a field of wheat sown with purchased seed. The grubs which destroyed much of the wheat did not interfere with this plant. [This proves to be a strongly-growing species of *Silene*, sometimes grown as a flower garden ornament. It produces very great quantities of seed, and may prove to be a noxious weed. All grain should be thoroughly cleaned before being sown.—GEN. SEC.]

CROPS AND CATERPILLARS.—Mr. Henderson said quite one-third of his early-sown crops had been destroyed by black rust (*Urocystus oculata*), but the rest were doing well. Mr. P. Anderson considered that the cockchafer grubs were the cause of what is called "takeall" in this district, and some other members agreed with him.

Albert, October 1.

Present—Messrs. J. Brewer (Chairman), J. Wetherall, T. Cooper, A. B. Struthers, G. Holmes, G. Mann, J. Gill, H. Lane, F. Stephens, H. L. Smith (Hon. Sec.), and fifteen visitors.

SOURSOPS.—Not prevalent. A few have been introduced on roots of fruit trees. Members determined to destroy it as soon as possible.

CONGRESS.—Hon. Secretary reported as delegate, and was accorded a vote of thanks.

Mundoora, September 30.

Present—Messrs. R. Harris (Chairman), T. Watt, N. J. Francis, W. J. Shearer, J. J. Vanstone, G. Haines, and A. E. Gardiner (Hon. Sec.).

FERTILISERS.—It has been found that phosphatic manures give best results in this locality. These should be drilled or harrowed under; when thrown broadcast on the surface no beneficial result appears. Not much experience has yet been gained in this district with regard to these matters.

SUBSOILING.—Considerable difference of opinion was felt upon this practice. Mr. N. J. Francis said he had always got best results from ploughing only 3in. to 4in. deep. Mr. R. Harris had tried 6in. on a small area with very poor results, and would recommend 4in. one year, 3in. next time, and 5in. the third year for stiff soils. The general opinion of members is that the soils in this district are loose enough without subsoiling, and would recommend experiments to be made on a small scale before adopting the practice of subsoiling, which might prove unsuitable for such soils.

Elbow Hill (Franklin Harbor), October 4.

Present—Messrs. E. Wake (Chairman), C. G. Ward, J. Harvey, James Spence, C. L. DuBois, T. Story, H. Dunn, J. Foulds, W. Spence, W. Ward, G. Wheeler (Hon. Sec.), and eight visitors.

THE TWINE BINDER.—Mr. C. L. DuBois read a paper upon the twine binder to the following effect:—

After fifteen years' experience he considered every farmer should use a twine binder to gather in a fair proportion of his crops before they are dead ripe, and thus avoid loss through wind and storms. The straw at that time is more nutritious as food than when left till the grain is dead ripe, the return of grain is greater, and a large area can be harvested with fewer horses. Steinwedel is one of the best of wheats for this locality, but is very liable to shed when dead ripe. With one twine binder it is possible to reap 150 acres before it can shake out much, and, as it is early ripe if sown soon enough, it can be reaped before most other varieties are ready. From experience, he could assure members he got from 2bush. to 4bush. more wheat per acre from twine-bound crops than from those that were stripped, and the grain was cleaner, brighter, and a better sample and color. The straw, with a little molasses and salt added, is quite equal to hay, and this makes a great saving. For instance, if he cut forty acres this year for hay it would mean a loss of about eighty bags of wheat; but by using the binder he would save those eighty bags, and probably twenty more, and still have plenty of food for his stock. To avoid damage to the machine from stumps, &c., he cuts about 6in. high, and has not one quarter of the breakages that are usually suffered by the ordinary stripper, and the cost for renewals and repairs during the whole time he has used the string binder has not exceeded £10, although he had cut as much as 320 acres in a season with it.

The Hon. Secretary thought that if some good system of thrashing could be introduced the string-binder would be of much greater value to farmers. The ordinary disc-header was practically useless, and the cost of a steam thrasher was too heavy for most farmers. The Chairman thought that several farmers could combine and procure a thrashing machine. Mr. Ward said he had seen fourteen men thrash 4,000 bush. in five days. [In some parts of America the "thrashing gangs" find machine, food, cooking, tents for residence, giving no trouble to the farmer's wife, and thrash, clean, bag the grain, and stack all straw, &c., at charges ranging from eight to ten cents. per bushel.—GEN. SEC.]

POINTS OF A GOOD HORSE.—The Chairman read a very short paper describing the points of a good draught horse.

EXHIBITS.—By Mr. Du Bois—Plant of red bearded wheat. By the Hon. Secretary—Well-grown plant of Beinke's Monarch wheat, which promises to be earlier than Steinwedel without its disadvantages.

Boothby, October 4.

Present—Messrs. J. T. Whyte (Chairman), J. Bell, R. Chaplin, T. Sims, A. Turnbull, E. Bradley, H. G. Evans, J. R. Way, and R. M. B. Whyte (Hon. Sec.), and two visitors.

RAINFALL.—At Yadaric, for 1896, 10in.; for 1897, 7in.; for 1898, to end of September, 9.54in.

CROWS, &c.—Messrs. Foulds and Turnbull gave the crows a very bad character, as they steal eggs, pull up wheat, pick out lambs' eyes, and sometimes kill (the Chairman said) fairly strong sheep. Mr. Foulds said he had seen them killing rabbits. Members consider the common magpie and whistling jays to be harmless.

MANURIAL EXPERIMENTS.—Mr. Foulds tabled nine parcels of wheat grown on land, some with and some without manures. He used Star phosphate, English superphosphate, Lawes' English super, and guano. He had been amazed at the growth made on poor stony ridges and the white sand patches where manure was applied. Mr. Turnbull had inspected the plots, and considered that for such a district as this, with so limited a rainfall, the Star phosphate was most suitable. He favored the use of a drill, as there would be a great saving of seed. Mr. Sims used phosphate last season, and can notice the beneficial influence again this year. The Chairman said the crops at the north end of the district never looked better than they do this season.

Lyrup, September 4.

Present—Messrs. A. Thornett (Chairman), T. Nolan, A. Klemm, A. Weaver, W. H. Walling, F. E. Chick, R. Brown, T. R. Brown, D. Bennett, A. Pomeroy, R. W. Skelton, W. H. Wilson (Hon. Sec.), and three visitors.

RAINFALL.—For September, 0.37in.; average for year, about 8in.

EXHIBITS—By W. H. Walling—All Head cabbage, very solid, weight 11lbs.

IRRIGATING WHEAT.—Members agreed that early sowing is best when the crop is to be irrigated. In May Mr. Shelton sowed a crop which yielded 1½ tons hay per acre. Between June 4 and 15 he sowed about thirty acres, which was irrigated before sowing and again in September. He got about 1½ tons hay per acre, and a piece left to ripen gave at the rate of 40bush. per acre. About 1in. of rain fell during period of growth.

SOURSOPS.—This weed was seen in a parcel of young trees, and members were recommended to exterminate all plants at once. Mr. Pomeroy said a sure cure for this pest is to turn fowls on the land.

Port Lincoln, September 16.

Present—Messrs. S. Valentine (Chairman), E. Chapman, K. S. Browne, W. Laidlaw, G. Dorward, J. Telfer, and John Anderson (Hon. Sec.).

OFFICERS.—The Chairman and Hon. Secretary were re-elected and thanked for past services.

ANNUAL REPORT.—The Hon. Secretary read his annual report, congratulating members on the great interest taken in the meetings of the Branch, and the useful practical work done during the past year. Eleven meetings had been held, at all of which the Chairman and Mr. Laidlaw had been present; the Hon. Secretary, 10; Messrs. Bruce and Goode, 9; R. Puckridge, 7; J. Telfer, 6; J. O'Shanahan, E. Chapman, and W. Hutcheson, 5; and the others only 4 and 3 each, an average of 8. Nine practical papers had been read and well discussed, in addition to many subjects brought forward at the meetings, all of which had been published both in the weekly newspapers and in the official *Journal of Agriculture*, and must have been beneficial to all who read these reports. Members all grieved at the death of Mr. J. St. George Puckridge, one of the founders of the Branch, and Chairman from the first meeting in June, 1889, till about twelve months ago. His interest in the Branch was active and intense. During that period sixty-four meetings had been held, and he was present at fifty-eight, which was wonderful considering his age. The past year has been most disastrous both for farmers and pastoralists, but brighter prospects now prevail. There has been a good lambing, reservoirs are filled by the rains, and there is a fair show of feed, whilst the wheatfields at present give hopes of a good harvest.

CONDOLENCE.—Members desired that a letter of sympathy be forwarded to the relatives of the late Mr. J. St. George Puckridge, who was an original founder of the Branch, and Chairman for eight years.

Forest Range, September 26.

Present—Messrs. J. Vickers (Chairman), J. Green, J. Sharpe, G. Monks, A. Green, W. Cherryman, J. B. Fry, R. E. Townsend, S. A. Collins, H. Waters, C. Stafford, R. Hackett (Hon. Sec.), and thirteen visitors.

INFLUENCE OF FORESTS.—The General Secretary offered a few remarks to the following effect:—

South Australia, considering its area, has less wooded land than any dependency under British rule. If all the scrub land and timbered country were divided amongst the population, there would probably not be a quarter acre for each soul. What would be the result if our population were increased to two or three millions? Already in parts of the North they have to cart firewood from thirty to thirty-five miles. Fences are getting old, railway sleepers are decaying, telegraph poles need renewal, bridges do not last for ever. Miners require much timber; furniture, machinery, implements of many sorts, ships, boats, wagons, carts, and very many articles need to be made of wood, and we ought to grow timber for all of these purposes instead of sending to distant countries for supplies from their rapidly-decreasing forest areas.

Apart altogether from utilitarian uses, trees are necessary as windbreaks in many localities. They beautify the landscape, and exercise a most decidedly beneficial effect upon the atmospheric and climatic conditions where they exist in any considerable number. The leaves absorb carbonic acid gas which is injurious to animal life, and give forth oxygen which is highly beneficial to animal existence. Living vegetation tends to equalise temperature—to raise it when cold and to reduce it when hot. It was a fact that living vegetation maintains a normal temperature, just as animals do. The normal temperature of man is 98° F., and if this rises to 104° F. he is in a fever, and will die if it rises two or three degrees higher. On the other hand, if the temperature falls a few degrees below 98° F. he will become torpid, and will die if his temperature cannot be elevated. Heat is conserved in the animal by a closing up of the pores, and heat is reduced by opening of the pores, profuse perspiration, and a refrigerative action is set up by the rapid absorption of the moisture in the air. This can be hastened by the use of a fan. Very much the same thing occurs in vegetable life. Living vegetation possesses a normal temperature of 45° F. to 50° F. When the weather is very hot the spiracles

or pores open, and there is considerable transpiration of moisture. Exact observations by American scientists have shown that a moderate sized soft-leaved tree will transpire as much 40galls. of water per day. It is easy to imagine that a very large quantity of water must be thrown out upon the air when we remember that trees renew their leaves and make a deal of growth every year. Deciduous trees throw their leaves within a week or two, evergreen trees are shedding and renewing all the year round. Nearly all, if not all, this growth is made by the sap brought up from the roots. This sap contains a very small portion of solids, but only those solids are used in the construction of leaves, twigs, wood, bark, &c. All the rest, consisting of water, is transpired, and goes into the air. What an amount of moisture there must be thrown into the atmosphere where large areas of forest exist. In the course of transpiration and absorption a cooling effect is naturally produced. What would be the effect of the presence of a large bulk of living vegetation having a normal temperature of say 50° F. when the air temperature is at 100° F., or even 150° F.? It is well known that hot air is always moist air, and that air will absorb moisture according to its temperature. When it is cooled down it parts with an equivalent portion of its moisture; so, when a hot wind comes into contact with a mass of cool green vegetation, it must be cooled, and it must part with some portion of its moisture. Where tall trees exist there is shade, and shade is cooler than the open sunshine—every animal knows this—and even the shade of a rock is cool. The shade under tall green trees is much cooler than under rocks or walls. During very hot weather the difference between the heat in the open and beneath the shade of green trees is very considerable. Beneath the shade of forests a rich humus is formed, and this keeps the roots cool in summer and warm in winter, besides absorbing and retaining a great quantity of water. By this means the springs are kept supplied, and rivulets are maintained. When the trees are destroyed the humus is quickly burned up by the heat of the sun, and instead of the rains and dews being retained all the water rushes at once into the channels and away to the sea. The soil is impoverished greatly, and plants perish for want of moisture. Everyone knows that dark substances absorb heat, and light dry substances radiate or throw off heat. Where large forests exist the leaves absorb and reduce heat. Where large areas of open country prevail—especially where dry grass, bare soil, and white vegetation only grows—there is a great radiation of heat, a tremendous expansion of the air above, and therefore there is a very large area of "high pressure" to be pushed out of the way when a "low pressure" area approaches our coast. If it were possible to establish a thousand square miles of forest in the Far North, it would most probably have a most beneficial influence on the climate to the southward, because there would be an area of much lower pressure over the forest. That South Australia once possessed large forests and a great rainfall is evident from the great deposits of bones of monstrous kangaroo, wombats, marsupial lions, and moa birds so far north as Lake Callabonna or Lake Mulligan. These monstrous animals could not have existed without a most luxuriant vegetation, and no doubt exists that these conditions prevailed long since the glacial period, which also once prevailed. What brought about the destruction of the heavy forests and cessation of the tropical rains no one at present can explain. It may have been due to an inroad of girdling insects, or to a rather long period of dry weather and occurrence of disastrous fires, but that there was once luxuriant vegetation is quite as certain as its absence now. It would be as wrong in himself to dogmatise upon the matter as it is wrong in others to do so in a contrary direction. It did not follow because a man was scientific in regard to geology, entomology, or any other "ology" that he should be able to decide positively that "trees do not exercise any influence upon climate, rainfall, temperature, humidity, &c.," but there have been men, profoundly learned in some "sciences," who were quite ignorant in respect to others, who have presumed to make the assertion just quoted.

History records hundreds of cases where the destruction of forests resulted most disastrously upon the climate of the denuded countries, and in some cases the re-afforestation of those places—always effected under almost insuperable difficulties—brought about the former prosperous conditions. In the *Agricultural Gazette* of New South Wales, Vol. VII., p. 28 (January, 1896), is given a statement of the condition of the provinces of Tartary in 1826, the most noted being that of Soyed, as described by Malte Brun, in writing of the Khanate of Bucharia, or Bokhara. "For eight days (says Iban Hanhob) we may travel in the country of Soyed, and not be out of one delicious garden. On every side villages, rich cornfields, fruitful orchards, interspersed by rivulets, reservoirs, and canals," and so on. About 1876 another writer said, "The Khanate of Bucharia presents a striking example of the consequences brought by clearing. Within a period of thirty years this was one of the most fertile regions of Central Asia, a country which, when well watered, was a terrestrial paradise; but within the last twenty-five years a mania of clearing has seized the inhabitants, and all the great forests have been cut away, and the little that remained was ravaged by fire during the civil war. The consequence was not long in following, and has transformed the country into a kind of arid desert. The watercourses have dried up and irrigating channels are empty. The moving sands of the desert, being no longer restrained by barriers of forest, are every day gaining upon the land, and will finish by transforming it into a desert as desolate as the solitudes that divide it from Khiva."

The "roof of the world"—the Himalayas—on one side is almost a desert now, but was once very populous, until the forests were destroyed. The other side of the same mountains is heavily timbered, has a large number of big rivers, and maintains an immense population. The now arid plains of Australind (South Asia) were once heavily timbered, but the trees were destroyed, and desolation followed. Germany, Greece, Italy, Spain, France, England, South Africa, India, all have suffered from destruction of forests—England less than the others, owing to her position, but where forests now exist they are near the coast, and not inland. On the Continent, owing to forest destruction, several streams that were once navigable by ships will now hardly float a rowing boat. In America enormous areas have been denuded by axe and fire, and the destruction is proceeding so rapidly that the Government is becoming alarmed, and is making efforts to stop the destruction and to re-establish the forests. So far, however, there are a thousand acres denuded for every acre replanted. The Russian steppes, now so cold in winter and so fiercely hot in summer that existence there is almost impossible in parts, were once heavily timbered and maintained a teeming and prosperous population. General Dibitch Balhanasky was responsible for this woeful work. When Ali Pasha burned the forests of Peloponnesus he brought famine and desolation upon an earthly paradise. Cases illustrating the same effects are recorded concerning the islands of Ascension and Mauritius, the Azores, Denmark, Sweden, &c.

On the other hand, where aridity once prevailed, by the planting of extensive areas with trees rain and fertility have been brought about on the Delta of the Nile. Within our own times there used to be only an average of six rainy days in the year. The Khedive caused millions of eucalypts to be planted during the past forty years, and now the average of rainy days has been increased to forty per annum. Napoleon III. caused millions of trees to be planted in France, with surprisingly beneficial effects, and in Algiers he had thousands of acres covered with trees, thereby doubling the number of rainy days.

It is undoubtedly true that there is an arid belt running through Australia, Africa, &c., but where forests cross that belt, as in New South Wales and Western Australia, there is a heavy rainfall. It may be claimed that the Australian Alps intercept and cause a rainfall in the eastern colony, but that is not the case in the west. South Australia stands between two points in this longitude, and her average is 20in., against 40in. to 60in. in the other places.

The General Secretary elaborated upon the above points, but there is no necessity to give more than the leading idea and argument. Mr. Copeland wanted to know what height should trees be to make a barrier in the gullies. [There should be belts across the gullies at short intervals, and they may be poplars, elms, sycamores, planes, or other suitable varieties for the locality]. Mr. Vickers had noticed that frost cut potatoes where sheltered by timber, and not in the open ground. Mr. Rowley had noticed that there was more frost in his garden in the vicinity of trees that had been ringed. Where only small clearings were made it might happen that springs would rise; but where large stretches of country were denuded of timber the springs dried up. Mr. Collins would like to know whether carobs were likely to thrive in the North. In reply to questions, the General Secretary said he would not recommend the cultivation of eucalypts in hilly districts where elms, poplars, oaks, sycamores, planes, and similar trees could be grown as breakwinds, chiefly for the reason that these trees would lend a charming variety to the landscape; but he advocated the retention of as large a number as possible of the indigenous eucalypts, etc., on the hillsides. The carob tree would be particularly well suited in the soils and climatic conditions of much of the northern parts of the colony. A vote of thanks was accorded.

EXHIBITS.—Mr. J. Green tabled a specimen of Rokewood apple in perfect condition, illustrating its splendid keeping qualities. Mr. Townsend brought in a weed which bore a great quantity of seed. It was found in a crop of wheat, and proved to be *Nigella hispanica*, a garden flower, but likely to become a pest if allowed to gain a footing in the fields.

Colton, October 1.

Present—Messrs. W. L. Brown (in chair), W. McElder, A. Stephens, M. L. W. Kenny, E. Whitehead, A. Bartlett, and W. A. Barnes (Hon. Sec.), and two visitors.

SCHOOL AGRONOMY.—This meeting was held at the Colton public school, and the teacher, Mr. Stephens, showed members around the experimental plots, consisting of several lots of peas, barley, oats, and over twenty varieties of wheat. There had been six or seven weeks of severe drought, and most of the plots were showing the effects, but African Baart wheat appeared to withstand it better than the rest. Some of the plots were sown thickly, some medium, and others thin, with and without manures, some 6in. deep, others 3in. The 3in. depth gave much the best results. Another set of experiments was to show the difference between plump, medium, and small grain, 100 seeds of each. The very small grain showed very poor results, the medium was much better, and the plump grain was best.

SEASON, &c.—Very light showers have fallen during the past two months, amounting in all to about 0.50. Weather cool, and vegetation slow. The early crops of Steinwedel are looking well; some other crops are almost beyond hope. Some of the shearing sheds have cut out, and all will finish in about a fortnight. The wool is in splendid condition this year.

Mannum, October 5.

Present—Messrs. J. G. Preiss (Chairman), O. A. F. Faehrmann, C. G. Pfeiffer, J. A. Schulze, J. A. Schuetze, S. Hausler, R. L. Herbert, Henry Brown (Hon. Sec.), and two visitors.

TAKEALL.—This disease of cereals is very prevalent this year, appearing on land that has been manured as well as on land not manured, on fallowed soils, on land that was used for grazing last year, on new land, dry land, and on that which is moist.

CATERPILLARS.—These are causing much damage in vegetable gardens. [Spray with tar water, made by dropping 4ozs. tar, drop by drop, into a gallon of water kept boiling, and stirring rapidly all the time; when mixed add 20galls. water and use. Or, lay down leaves of plants preferred by the caterpillars after sprinkling with sweetened water, upon which dust a very little Paris green mixed with flour.—GEN. SEC.]

FIELD TRIAL.—Decided to hold a field trial of harvesting machinery during November or December.

OBJECTS OF AGRICULTURAL BUREAU.—Mr. J. G. Preiss read a paper, of which the following is a digest:—

The object of the Agricultural Bureau is to improve agronomical industries, without which civilisation could not possibly exist. The word "agronomy" is the short way of indicating agriculture, horticulture, viticulture, arboriculture, dairying, breeding of live stock, bee-keeping, &c. To effect this object the Bureau places before agronomists the results of the experience of its 1,500 members, resident throughout the whole area of the colony. Their intelligence, study, and learning are placed at the disposal of every individual. Books, reports, &c., are procured from all parts of the world, as well as seeds and plants that are likely to prove of any value, and improved methods of treating what we already have are sought out and published broadcast. Men having special or scientific knowledge are induced to deliver lectures, give practical demonstrations, and conduct experiments all over the colony. Another object is to prevent the introduction of farm and garden pests and diseases amongst stock, and to assist agronomists in combating those already existing here. No one would question the necessity for improvement in cultivation of the soil, and in the dairy industry, or in the rearing of poultry, &c. We have to cater for markets outside the colony, and must necessarily compete with other countries, but will fail to secure remunerative prices unless we adopt the very best systems of producing, packing, &c. He referred to the early days, when farmers could grow splendid crops on the virgin land without trouble, and to the fact that constant cropping had so weakened the producing power of the land that farmers were induced to move to other parts—including Murray Flats—and carried on the same kind of work. But it is necessary to improve upon this, else many farmers will again have to seek "fresh fields and pastures new." The cause of this deterioration in the producing character of the soil was traceable to the constant removal of wheat, thus reducing the available supplies of plant food.

As a 25bush. crop removes 29·90 per cent. of nitrogen, 12·07 per cent. of phosphoric acid, 7·86 per cent. of potash, 5·50 per cent. magnesia, lime, &c., it would be easy to calculate what has been removed from each field by reckoning up the total number of bushels. The quantity of these substances existing in an available condition is limited, even in the best of soils, and if there is not a sufficient quantity of each and every one of them in an available form for the production of a full crop, the deficiency of any one will prevent the utilisation of the rest, even though there may be great abundance. That would explain why the old lands will not grow wheat as they used to do; we have too greatly reduced the available necessary constituents from the soil, and have neglected to replace them. This explained also why the application of, say, 100lbs. of superphosphate of lime, containing only 18lbs. to 20lbs. phosphoric acid to an acre of land increased the yield by 6bush. or 7bush., as it did last year. Phosphoric acid was deficient, whilst there was a sufficiency of nitrogen, potash, &c. He had great hopes that with the aid of the seed drill and use of commercial fertilisers farmers would now be able to hold their own. But they must continue to study and to fight against difficulties. So far they had found no deliverance from the dreaded "takeall." The Bureau has helped to make farm life more attractive by showing the more rational and intellectual methods are the most sure to make farming pay. By study, practice, observation, and exchange of experiences, thoughts, and opinions, and frequently meeting together, this desirable consummation would be effected.

CROPS AND WEATHER—Wind has damaged a great many crops, and the absence of rain is causing much anxiety. Unless rain falls soon the prospects will be no better than last year.

Arthurton, September 29.

Present—Messrs. W. Short (Chairman), M. Lomman, H. J. Freeman, W. Smith, W. H. Hawke, T. B. Wicks, C. Koch, J. Koch, M. Baldock, H. Baldock, J. W. Parker, J. Pearson, J. B. Rowe (Hon. Sec.), and six visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of Messrs. Lomman and Freeman, who first showed their oil engine at work cutting chaff, and elevating it into the chaffroom above a stable for twenty-five or thirty horses. There is a passage between the stalls, and the horses stand tail to tail, so that a drag can be used for cleaning the stable. Narrower passages in front of the stalls allow easy access to each for feeding, and a light tramline with boxes on wheels passes along these passages for conveyance of fodder, which is measured out with a handled scoop. Next, the wheat and other crops were inspected. The wheat drilled in with manures looked very promising, but some that was put in without any fertiliser is a long way behind, notwithstanding the good rains experienced. The garden was in excellent good order. The vines had been cut by a frost in some places; the fruit trees gave promise of a fair yield. A grain and fertiliser drill, made by Mr. C. H. Smith, Ardrossan, had been used for sowing sorghum, and had proved very satisfactory. Mrs. Freeman provided refreshments on a liberal scale, and thanks all round were passed.

FIELD TRIAL SOCIETY.—Balance-sheet received and considered satisfactory. Two delegates appointed to attend meeting at Kadina on October 5, to consider whether money prizes shall be offered at next competition, and to settle other matters. Decided, if possible, to hold a trial of harvesting machinery near Kadina. Suggested that £3 be offered as first prize to drivers of teams for reapers and binders, drivers to places machines on the ground free of cost to manufacturers after arrival at railway station. Money prizes to be given to headers, thrashing machines, and winnowers, and certificates for second prize in every case.

FERTILISER ANALYSIS.—Mr. Hawke tabled analysis of a guano which showed phosphoric acid 17·7 per cent., equivalent to 37·9 per cent. tricalcic phosphate. Members cannot understand why this does not give a better return with so good a percentage. [Tricalcic phosphate is rather insoluble in water, and therefore much slower to respond as compared with superphosphate.

Thomas phosphate, with its four parts lime to one part phosphoric acid, although theoretically still more insoluble, is perhaps quite as active in moist soils, because it is ground to impalpable powder.—GEN. SEC.].

RAINFALL.—At Winulta—For August, 3·12in.; for September to date, 0·87in.; for year to date, 18·9. At Tiparra—For September to date, 0·87in.; for year to date, 18·30.

Crystal Brook, October 1.

Present—Messrs. George Davidson (Chairman), J. C. Symons, R. Pavy, W. J. Venning, W. Nott, W. Morrish, and George Mills (Hon. Sec.).

FIELD TRIALS.—A motion is to be discussed at the next meeting for the purchase of, say, twenty acres to be used for field trial purposes, and that any experimental planting, &c., shall be conducted there; results obtained to be placed to credit of Field Trial Society.

CHAFF.—Decided that standard bag of chaff should weigh 42lbs. net, and a ton of chaff should be 2,000lbs.

DAIRY WORK.—Mr. W. Nott read a paper on this subject. The following is an abstract:—

He considered the dairy type of Shorthorn the best, and heifers should be saved only from the best milkers. Get good cows to start with and then it is easy to get good heifers from them. Where twenty to thirty cows are kept there should be three or four good Alderneys, because their butter is always of so rich a color, and would tend to improve the color of the rest. The cross between an Alderney bull and a Shorthorn cow has turned out well. He had tried Herefords and did not like them; and Ayrshires gave poor milk, but plenty. Cows should be milked punctually, and eight cows per hour is fair work when properly stripped. Heifers should be milked for as long as old cows. He believed some cows go dry soon because they were not milked long enough when young. The best time for most of the cows to come in is May and June, and each should make £10 worth of butter in a year. Heifers make the best cows when they come in at three years of age, and a cow is at her best with her third calf. The bull should not be allowed to run with the cows all the year, but should be tied up for several months. Give some hay or chaff to the cows every day when the grass is young. He did not consider ensilage good for cows, and found they did as well upon hay without ensilage. Potatoes do more harm than good; but mangolds are first class, and produce first-class butter.

WEATHER AND CROPS.—Hay-cutting will soon commence, and on some farms will give 25cwt. to 30cwt. per acre. Drilled crops are looking well where manured. Mr. Hamlyn's manured crop shows six or seven stools to each plant, whilst unmanured plots show only two or three.

RAINFALL.—For September, 0·55in.

Port Broughton, September 26.

Present—Messrs. R. W. Bawden (Chairman), W. Tonkin, R. Storr, J. Bates, T. Rayson, J. Barclay, George Pittingale, W. R. Whittaker, J. Harford, H. H. Whittle, and S. M. Bawden (Hon. Sec.).

FIELD TRIAL SOCIETY.—Delegates appointed to attend meeting at Kadina to favor award of gold and silver medals, value £3 and £1 10s. respectively, as first and second prizes, but no money prizes.

ANNUAL REPORT.—Chairman read annual report. Eleven meetings had been held, with average attendance of eight members; five papers read, and one lecture by Mr. Thompson, Dairy Instructor, to a fair audience of farmers and families. Two field trials had been held—strippers at Agery, and ploughs and drills, &c., at Bute. A combined show had been held at Port Broughton under the auspices of the Pine Forest, Mundoora, and Port Broughton Branches. He was pleased to see members taking more interest in the work of the Branch.

CONGRESS.—Delegates reported on proceedings at the Tenth Annual Congress of the Bureau in Adelaide. They considered the proposition for establishment of a reserve fund among farmers a good idea. A farmer would not miss one or two bags of wheat in a good season, and this would be a great help to others who have not been so fortunate. Delegates consider that a day should be set apart, especially for members of Congress, to visit the Port Adelaide Depôt and the Agricultural College. At both the latest and the former Congress gatherings there were so many visitors to the above places that the delegates could not gain any useful information.

SOURSOPS.—This weed has not yet been seen in the district by any member.

Millicent, October 6.

Present—Messrs R. Campbell (Chairman), H. Hart, H. F. Holzgreffe, S. J. Stuckey, L. Oberlander, G. Muttar, H. A. Stewart, A. McKrostie, W. J. Whennen, B. Varcoe, and E. J. Harris (Hon. Sec.).

DONATIONS AND SEEDS.—Chairman reported gifts of several books for the Branch library, also seeds from Central Bureau. Messrs. Holzgreffe, Varcoe, and Oberlander tabled several varieties of seeds for distribution.

EXHIBITS.—Chairman tabled sample of rye and Algerian oats nearly 6ft. high; also "soursops" found growing around fruit tree planted last year. Mr. Hart reported that the Abutilon (Chinese lantern flower), makes a good fibre. [It would not pay to grow under our civilised conditions; requires labor at 2d. per day of fourteen hours.—GEN. SEC.].

RAINFALL.—At Millicent, for September, 2·910in. At Mount McIntyre, for September, 3·180in.

WEATHER AND CROPS.—Very dry for past few weeks. Rain much needed. All crops looking well; every prospect of a good yield.

Mount Compass, October 8.

Present—Messrs. H. Jacobs (Chairman), T. Chaplin, E. Good, C. S. Hancock, A. J. Hancock, R. Peters, F. Slater, D. Wright, and H. McKinlay (Hon. Sec.).

EXHIBITS.—By Hon. Secretary—Japanese clover and Profusion pea; by G. Langley—Cut potatoes.

PIG DISEASE.—Members desire following to be published. Mr. D. Wright reported pig to be recovering after treatment suggested by General Secretary, viz :—"Give 3ozs. or 4ozs. magnesia, then administer 2 drams sulphate of iron every other day for twelve days. Afterwards, if confined, give a tablespoonful of castor oil and feed on soft food, but not too much for a few weeks. Give nothing in the way of corn. Wash the skin with soft soap and oil." Mr. Valentine thought worms were the first cause, and too much sulphur was given.

GRUBBING HEAVY TIMBER.—In discussing this subject some members favored lever and chains, others advocated a double tackling for pulling down after cutting the roots, and some thought a saving of labor could be effected by use of fire

POTATO SETTS ROTTING.—Mr. G. Langley brought in samples of potato setts. These were small potatoes cut lengthwise, and nearly every sett—both this season and last—went rotten soon after planting. He had tried cutting them in the shade and in the sun, but the same result followed within twenty-four hours. [It would be better to plant the whole potato in this case. Some varieties are very liable to go wrong in this way.—GEN. SEC.]

Eudunda, October 3.

Present—Messrs. F. W. Paech (Chairman), C. L. E. Lutz, A. Kluske, C. Pfeiffer, A. Pfitzner, H. D. Weil (Hon. Sec.), and a visitor.

SOURCES.—Only one or two members have seen this weed in the district, and no steps have been taken to eradicate it.

WEATHER AND CROPS.—The prospects of a good harvest have been greatly reduced since last week, the storm and hot dry weather doing a lot of damage. Hay harvest will be general in a few days.

Brinkworth, September 30.

Present—Messrs. R. Cooper (Chairman), A. L. McEwin, J. F. Everett, W. Wundke, G. Freebairn, A. L. Morrison, S. Auger and J. Stott (Hon. Sec.).

EXHIBITS.—By Mr. Wundke—Some very fine turnips and some wheats, produce of seed sent up by Central Bureau. Golden Return very fine and in ear; Leak's Rustproof also large, but not in ear.

LECTURE.—On October 8 Professor W. Lowrie, M.A., B. Sc., Principal of Roseworthy Agricultural College, gave an address on "Restoration of the Soil" to a fair audience, and answered a number of questions.

Johnsburg, October 1.

Present—Messrs. F. W. Hombsch (Chairman), T. Thomas, J. R. Masters, L. Chalmers, W. McRitchie, H. Napper, T. A. Thomas, H. Arnold, M. L. Read, W. James, G. H. Dunn, T. Johnson (Hon. Sec.), and one visitor.

CLEANING AND WEIGHING WHEAT.—The Chairman read a paper upon this subject, of which the following is the substance:—

The farmer does not fix the price of his grain, but has to accept prices fixed by the buyer; but, if he wishes to purchase any article, he must pay the price fixed by the seller. A standard weight is fixed annually by the Chamber of Commerce for the season's wheat; and if a bushel does not weigh up to standard the farmer must submit to a reduction of 2d. to 3d. per bushel, whereas if the bushel weighs heavier than the standard the farmer derives no benefit. It was to the interest of farmers to maintain a high standard character for Australian wheat. He referred to samples of wheat in the Museum of Economic Botany at the Adelaide Botanic Garden, where "Wheat as supplied by farmers" was shown, very dirty with chaff, straw, &c., whilst another was very clean and labelled "As cleaned by the miller"; but he thought this was put there by some miller to advertise his machinery. Still, many farmers are very careless in cleaning their grain, the reason being that much of it is done by piece-work. At harvest it is necessary to get the crop in quickly to avoid loss by storms, &c., and often absolutely unskilled labor must be employed to work the winnowing machine; and the price is often fixed so low that the men are tempted to rush the grain through in a slovenly manner. Then there is no encouragement offered the farmer to make an extra good sample. He was of opinion that if a sample weighed 2lbs. or 3lbs. above standard weight per bushel a better price should be given. He suggested that wheat should be classed in three grades—First, above standard weight; second, at standard weight; third, below standard. He believed the Farmers' Union was doing something in this direction. The weighing-machines used by the various purchasers should be periodically tested by an official.

Baroota Whim, September 29.

Present—Messrs. F. H. Flugge (Chairman), T. J. Simper, A. Rancburg, M. Pillion, and C. W. Hoskin (Hon. Sec.).

SOURCES.—This weed is not yet known in the district.

WEATHER AND CROPS.—Weather has been dry lately and rain is badly wanted, as the cereal crops are drying up.

Naracoorte, October 8.

Present—Messrs. O. Hunt (Chairman), S. Schinckel, J. Wynes, H. Buck, J. D. Smith, G. Greenham, D. McInnes (Hon. Sec.), and one visitor.

HON. SECRETARY'S REPORT.—Hon. Secretary reported that the Dairy Inspector (Mr. G. S. Thomson) had visited the butter factory, on August 26th, and had lectured to a number of people in the council chamber on "Dairying." He also reported upon his attendance with other members at the Tenth Congress in Adelaide, and upon their visit to the Agricultural College. Members discussed the characteristics of the Jersey, Alderney, and Guernsey cattle, as well as several of the papers, &c., read at the Congress.

HOUSEHOLD PARLIAMENTS.—Mr. R. Campbell, Millicent, wrote concerning the "Grange" established there. Monthly meetings are held between September and April. A president, vice-president, and hon. secretary carry on business. Members consist of heads of families, sons, and daughters. Any person wishing to acquire or give information upon domestic and practical matters may be a member. Subjects often dealt with are jam-making, fruit and vegetable preserving, cooking, and domestic economies.

DISEASES OF FRUIT TREES, &c.—Chairman thought spraying trees would not prevent their being attacked, but when the proper compounds were used they would cure diseases. He did not approve of watering trees as a rule, but recommended the use of liquid manure at the roots in summer. He said aphides were very plentiful this year. [Cover the trees with a tent, and burn some tobacco beneath. This will destroy every aphid on the tree.—GEN. SEC.]. Chairman advised members to spray apple, pear, and quince trees with arsenite of lime or with Paris green directly the flowers have dropped their leaves. Frost had injured some of his vines, and hail had battered Mr. Smith's mangolds badly. The field poppy was becoming very prevalent on pastoral lands. Members reported crops looking rather too strong.

Murray Bridge, October 8.

Present—Messrs. F. H. Wurm (Chairman), W. Schubert, H. Block, B. Jaensch, W. F. Wundersitz, J. G. Newmann, and R. Edwards (Hon. Sec.).

WEEDS.—Mr. J. G. Newmann read a paper concerning "Some Weeds Prevalent in the District of Moblong." The following is a very short abstract:—

He described weeds as "plants that grow where you do not wish them to grow." Some are noxious, either by monopolizing the soil to exclusion of plants which we wish to grow, or may prove more or less injurious to stock, which eat them only (as a rule with a few exceptions) when wholesome plants are scarce; or they may depreciate the value of wool by means of adhering seed. Although this district is not as yet so much troubled with weeds as are some other parts, yet there are several which cause annoyance, amongst them being—

Sheepweed (*Lithospermum arvense*), introduced from Europe. It has been called "cheek-weed," because the pink color on the skin or bark of the roots was at one time used as a cosmetic for dyeing the cheeks and lips. It is as troublesome in Europe as it is here, choking the young wheat-plants. Small birds are fond of the seeds. It has been noted that a change of crop to oats or barley exercises a repressive influence upon the reproduction of this weed.

Stinkwort (*Inula graveolens*) from Mediterranean coast grows quickly after the cereal crops are removed, and is checked by cultivation. Sheep and cattle eat it only when other food is exhausted. He had heard that horses fatten on it in the South-East. It makes a good green manure if ploughed under when growing. It is used in Europe for smoking pork, and gives it a delicious flavor. [Mr. John Lewis, Burra, makes splendid flavored ham and bacon with aid of stinkwort smoke.—GEN. SEC.]

Catchfly or sticky weed (*Silene gallica*) is another introduced weed, found on cultivated and grass lands. It tries to choke all other vegetation, and spoils the quality of hay. Cattle will not eat it.

Cockspur (*Centaurea melitensis*) is extremely difficult to exterminate, because the seeds are winged and extremely numerous, so that plants growing by the roadside continue to re-grow in the fields adjacent.

Drake or darnel (*Lolium temulentum*), wild or hedge mustard, Cape marigold (*Cryptostemma calandulacea*) and barley grass are often more beneficial than injurious weeds. The Bathurst bur (*Xanthium spinosum*) and stemless horse thistle (*Cirsium acule*) are examples of useless noxious weeds, the former especially causing injury to wool through its many hooked seed pods.

The three-cornered Jacks or cat's head (*Emex australis*) is indigenous to South Australia, and is always found near the seacoast on sandy soils, but it is spreading in this district to an alarming extent. It is eaten by sheep, and but rarely by cattle when young. Directly its prickly-covered seeds appear cattle and horses refuse to touch it. When raked up with hay these animals will only reluctantly feed upon it, and it inflicts pain upon the hands of men who handle the fodder. As many as 800 seeds were counted upon a single plant, and they will adhere to the wool of sheep. Every plant of this weed should be pulled up and burned.

Hartley, October 7.

Present—Messrs. C. Harvey (Chairman), A. Thiele, J. Jaensch, H. Reimers, A. Dalton, and H. Lehmann (Hon. Sec.).

TIME TO CUT HAY.—Mr. Harvey said the best time to cut hay was just after flowering, as then the plant contained the greatest amount of nutriment. Mr. Lehmann said hay ought not to be cut when the grain was hardening, as then the straw began to become flinty. To keep hay good, and prevent mice attacking it, Mr. A. Thiele would use a small quantity of salt—not too much.

RAINFALL.—For September, 0.71 in.; October, to date, 0.68 in.

Dawson, October 1.

Present—Messrs. R. Renton (Chairman), John Collins, C. W. Dowden, C. F. W. Just, C. C. Kyd, O. H. Meyers, F. Schibella, A. H. Warner, A. F. Dempsey (Hon. Sec.), and two visitors.

STAR THISTLE.—Hon. Secretary reported star thistle to be early this year, and district council members promised to attend to its extirpation.

EXHIBITS.—Mr. Schibella tabled an unusually large lettuce, and said he had grown splendid vegetables this season, but the dry weather was now causing them to run prematurely to seed. This is the general experience of members.

TAGOSASTE.—Mr. Meyers thought the true tagosaste (*Cytisus palmensis*) would do well in this locality, and hoped to secure some seeds. The "tree lucern" (*Cytisus proliferus*) grew satisfactorily. [There is another plant which is better entitled to the name "tree lucern." This is *Medicago arborea*. This shows the general absurdity of popular nomenclature, which gives the same "common name" to several plants quite distinct from each other.—GEN. SEC.]

CONGRESS.—The Hon. Secretary reported upon his attendance at the Tenth Congress of the Bureau, and directed attention to several papers and discussions. He also referred to the visit to Roseworthy Agricultural College, and to other matters, and discussed the arrangements made for visitors.

Meadows, October 3.

Present—Messrs. J. Catt (Chairman), W. Pearson, T. Grigg, T. B. Brooks, G. Usher, T. Usher, W. Nicolle, W. V. Wade, and W. A. Sunman (Hon. Sec.).

LUCERN FLEA.—This pest is very prevalent, and it is desired to find some fodder plant not subject to its attack. Mr. Pearson directed attention to tobacco waste as a possible check to this pest.

FODDER PLANTS.—Mr. Pearson started a discussion upon fodder plants. He had tried many, amongst which he found the best to be lucern, sorghum varieties, and mangolds; ensilage also was valuable. Mr. Grigg did not favor maize, and thought prairie grass and lucern best. Most of the members favored lucern and ensilage, as they thought maize produced fat and not much milk.

Richman's Creek, September 26.

Present—Messrs. A. Knauerhase (chair), J. A. Knox, P. J. O'Donohue, W. J. Wright, A. Nicholson, J. J. Gebert, J. McColl (Hon. Sec.), and one visitor.

SOURSOPS.—This weed has not yet been seen here.

RAINFALL.—Average for nine years, 11·48in.

CONGRESS, &c.—The Hon. Secretary reported upon his attendance at the Tenth Congress in Adelaide, also upon the visit by farmers to Roseworthy Agricultural College. The experiments on the farm with fertilisers and the numerous varieties of cereals proved highly interesting. He thought some better discrimination should have been used with regard to the issuing of tickets.

QUESTIONS.—To prevent cows robbing their own udders tie a strap round the girth, with a rein from each horn tied back to the strap, about the level of the point of the shoulder. For bloat, hoven, blown, or tympanitis give the animal one to two tablespoonfuls of carbonate of soda in a pint and a half of water.

RAINFALL.—For August, by Mr. W. Freebairn, 3·74in.; by Messrs. A. & J. McColl, 4·22in.

Calca, October 1.

Present—Messrs. A. Newbold (Chairman), A. B. Smith, D. C. Drever, J. Bowman, J. E. Freeman, R. H. Squire, D. P. Thomas (Hon. Sec.), and eight visitors.

FARMING OF SCRUB LAND.—Mr. R. H. Squire read a paper upon "How to Farm Scrub Land on the West Coast":—

As the winds are so strong on the West Coast do not fallow light soils, but put in the stiff soils first, and after the country has had a good soaking work the light soils. If the land is grassy scarify the seed in with the skim coulter, and then harrow it and kill the grass. A good many farmers try to put in more than they can with ease, and this does not pay. When there is strength only to put in 200 acres do not try to sow 500 acres. The seed will be thrown away. Commence sowing before May and finish in June, not later. Where the soils are liable to blow away leave strips of scrub about a chain wide to a t as breakwinds at the tops of the hills until the grass or stubble can be got to cover the soil and hold it. There should be a narrow belt of scrub left around each field to protect the crops and soil from the wind. Only just cover the seed, and never sow deeply, else the plant will come up weak. The roots of the wheat plant will run down deeply, and in light sandy soil a good harrowing is all that is required—that is, once the way it was ploughed and then cross-harrowed. By doing this better returns will be secured and less seed and labor wanted.

LOSS OF SHEEP.—Mr. A. B. Smith reported loss of several sheep. They appear stiff in the limbs, get worse until they fall and die. They swell rapidly after death, and are quite fat when attacked. They had lived ten weeks in the same paddock prior to being attacked. Members attributed death to the sheep eating poison plants, which are sometimes only deadly when in flower or seed at this time of year.

WEATHER AND CROPS.—The crops have suffered much from the long drought, and will almost fail if rain does not fall soon. Rainfall for September, 0·26in.

Craddock, September 24.

Present—Messrs. R. Ruddock (Chairman), J. Clarke, J. Patterson, J. Ramsay, B. Garnett, A. E. Clarke, T. Fitzgerald, J. H. Trevell, and one visitor.

CHAFF.—Members considered that the standard weight of a bag of chaff should be 52lbs., with bag.

CROWS.—Members universally condemned the common carrion crow (*Corvus australis*) on account of its ravages in the farmyard, the field, and the lambing paddock.

Robertstown, October 12.

Present—Messrs. N. Westphalen (Chairman), A. Day, A. Rohde, J. E. Milde F. Fielder, and S. Carter (Hon. Sec.)

OXALIS.—Only one member has seen this in the district.

TAMARIX GALICA.—The Hon. Secretary reported that he had experimented with tamarisk cuttings. He placed a number in water until green shoots appeared, and then planted them. Others he planted without soaking. At present the soaked cuttings had shoots 6in. long, whilst the others were just starting to grow. Mr. Day said that fowls are fond of the green shoots when no other green food is procurable.

Gawler River, September 30.

Present—Messrs. A. M. Dawkins (Chairman), R. Badcock, F. Roediger, D. Humphries, J. Hillier, G. Johnston, J. Badman, A. Bray, H. Roediger (Hon. Sec.), and two visitors.

TAKEALL.—Chairman from long experience recommended that land liable to be affected with "takeall" should never be ploughed or worked whilst in a dry state. On such land a crop of oats should be grown, as "takeall" generally disappears after a crop of oats. Other members had experienced the same results. The Hon. Secretary had tried lime, all sorts of manures, but without any beneficial result, so far as "takeall" was concerned. But the last time the disease appeared he dug the crop under on each patch, and since then the same land has produced excellent crops without any sign of "takeall."

EXHIBITS.—The Hon. Secretary tabled All-head cabbage, weight 12½lbs., grown from seed sent by Central Bureau. He also presented seeds of named sweet and water melons.

Mount Pleasant, October 14.

Present—Messrs. G. Phillis (Chairman), F. Thomson, W. Vigar, W. Lyddon, H. Drogomuller, P. Miller, A. Baker, and H. T. Hull (Hon. Sec.).

AGRICULTURAL SHOWS.—Professor Lowrie's paper on "Agricultural Shows," read at the Tenth Congress, was discussed. Members agreed that there are too many shows; but to limit the number for the whole colony to three per annum would be an error in the opposite extreme. Perhaps a distance limit of twenty-five miles might be fixed. The great area of the province and the difficulties of travelling—of prize stock especially—where there is no railway would hinder thousands from visiting the distant shows, or exhibiting stock, &c. Many agricultural societies had gone to great expense in purchasing and laying out their show grounds, and would suffer from withdrawal of the Government subsidy.

RAINFALL.—For four weeks ending October 14, 1.35in.

Maitland, October 1.

Present—Messrs. H. Pitcher (Chairman), J. W. Shannon, H. Bawden, O. Treasure, J. Hill, W. Wilson, Thomas Bowman, A. Jarrett, J. Kelly, and C. W. Wood (Hon. Sec.).

STUD BULL.—An Ayrshire bull, "Doctor II.," has been loaned by the Agricultural Department for use in the district, and Mr. J. W. Shannon, M.P., takes charge for the first quarter.

GRUBS.—One farmer states that his crops appear to be somewhat affected by the grubs of the small cockchafer beetle which has done so much damage further south on the Peninsula; but members doubt if it has yet reached this locality.

GARDENING.—Mr. Wilson read a paper upon this subject, and in discussion Mr. Jarrett remarked upon the fact that so few of the working men in and around the township made use of the land around their residences, although it is so well suited for the growth of vegetables, and would benefit their health and pockets and save doctors' bills.

Cherry Gardens, October 11.

Present—Messrs. E. Wright (Chairman), T. Jacobs, J. Lewis, C. Lewis, J. Potter, W. Nicolls, G. Choate, G. Brumby, G. Hicks, J. Richards, C. Ricks (Hon. Sec.), and one visitor.

UNDERGROUND CATERPILLARS.—The fat caterpillars (a species of *Agrotis* moth), which bury themselves during daylight, are now becoming prevalent. The mixture of 30lbs. bran, 1lb. Paris green, and 5lbs. molasses with sufficient water to make it a thick paste, and scattered in lumps the size of a cobnut, has been found very effectual in protecting strawberries and other crops against these insects.

DESTRUCTION OF NATIVE BIRDS.—Mr. Jacobs called attention to the fact that children were being offered prizes for making collections of eggs of all kinds of native birds; and, as most of our birds are insect-eaters, this would result disastrously for fruitgrowers and gardeners generally, by destroying the "balance of nature" and promoting an enormous development of insect pests. Members promised to do all in their power to discourage destruction of birds and egg-collecting in particular.

Balaklava, October 15.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, J. Mills, J. Crawford, E. Roberts, W. Smith, G. Reid, A. W. Robinson, and E. M. Sage (Hon. Sec.).

STOCK COMPLAINTS.—Mr. Reid stated that since shearing three of his ewes had gone blind. They were full grown but not old sheep, and had no wool over the eyes before shearing. The eyes were now swollen and full and covered by a white skin. The same thing happened to some of his sheep five or six years ago, and he would like to know the cause. [Probably ophthalmia. Bathe the eyes twice a day with alum water—1oz. alum in 1pt. of water.—GEN. SEC.]. Mr. Reuter stated he had lost a good cow recently, from apoplexy.

MANURES AND WEEDS.—Mr. Robinson thought farmers should stipulate for manures to be delivered in new bags. At present guano, bonedust, &c., were sent out in bags of all descriptions, and as these were obtained from all parts, they were likely to be the means of distributing seeds of undesirable plants. Mr. Roberts stated that where he applied some guano he got a

splendid crop of chickweed, and as it was prevalent on no other part of his farm he naturally thought the seeds were brought on to the land with the manure. The Hon. Secretary thought as bones were gathered from all quarters for the manufacture of bonedust, and as the crushing of the bones would not destroy seeds, it was quite possible for seeds to be distributed in bonedust. Members stated that wild mustard was spreading in the district, but was not regarded as such a pest as some other weeds, as it was eaten by stock, which seemed to do well on it. Mr. Robinson said he had heard that sheep scoured badly if they eat freely of this plant. The Hon. Secretary said he had read that rape had a similar effect on sheep unless they had free access to salt, and as the two plants were closely allied it was probable salt would prevent the mustard causing scouring.

MINERAL WATER AND BLUESTONE PICKLE.—The Hon. Secretary wished to know whether it was at all likely that there would be any difference in the action of bluestone pickle for wheat if made with rain water or well water containing minerals. If the latter had any effect on the pickle it was important that the farmers should have their attention called to the fact. [The water would have to be very bad before it would have any appreciable effect on the bluestone. Water fit for stock purposes would certainly have no appreciable effect.—GEN. SEC.]

Gladstone, October 1.

Present—Messrs. J. King, (Chairman), J. Tonkin, E. H. Matthiessen, J. H. Rundle, C. Gallasch, W. A. Warnum, B. Griffiths, J. Shephard, J. Brayley, J. Prior, J. Greig, and J. Milne (Hon. Sec.).

DAIRYING.—The Hon. Secretary reported that the Jersey bull loaned to the Branch by the Department of Agriculture had arrived in good condition. Matters in connection with the care and management of the bull were dealt with.

CONFERENCE.—It was decided that the Conference of Northern Branches is to be held at Gladstone, during the third week in February.

Pyap, October 14.

Present—Messrs. W. Axon (Chairman), K. F. Huselius, J. Bowes, T. Teale, E. Robinson, J. Harrington, J. Aird, B. T. H. Cox, W. C. Rodgers (Hon. Sec.), and four visitors.

VINE TROUBLES.—Several members reported that many vine shoots were dropping off at the junction with last year's growth, and bleeding profusely. The Muscats are principally affected, but some Zante currants are also suffering, though not to same extent as last year. Mr. Teale thought it due to same cause as the dark warty lumps on the roots and trunks. It might possibly be the effect of too rapid growth, though it is most noticeable in the vines getting least water. Members agreed that it was not caused by windy weather, as in most cases the vines had been carefully tied. Large green caterpillars are doing considerable damage to the vines.

IRRIGATING CEREAL CROPS.—The Hon. Secretary showed sheaves of Champion Beardless and Menshury barley from Bureau seed. The seed was sown on March 31, and irrigated; the plots averaged 4½ ft. high and produced a splendid sample of grain. From ½ oz. of seed sown he obtained 6 lbs. grain. Plots unirrigated grew to height of 1 ft. and gave no grain. Oats irrigated averaged 5½ ft., and promised a heavy yield, while that left to nature

is practically a failure. A discussion ensued on irrigating wheat for seed, and a sample of wheat 5ft. high, with good plump grain, was tabled. This was from seed grown on an irrigated plot, and as compared with results from seed sown on land not irrigated was much superior and ripened early.

LEMON SCALE.—Mr. Teale strongly recommended spraying lemon trees in winter to prevent injury by scale, even if the insects are not noticeable. Several trees are now plainly affected, but being in full blossom cannot now be sprayed. It was reported that a small brown beetle was attacking the lemon trees and destroying the fruit buds.

Mr. Huselius reported complaint amongst cattle on the settlement. One cow in milk, one dry, and one of the working bullocks were affected, the symptoms being restlessness, watery eyes, slime running from nostrils, nervous twitching in the neck, udders of cows of a "pinkish" color, and skin generally tender; there was no cough, but violent sneezing. They had been given a dose of Epsom salts and a little sulphur in the water, and were gradually recovering.

Onetree Hill, September 30.

Present—Messrs. J. Bowman (Chairman), A. Adams, F. Barritt, F. Bowman, G. Bowman, J. Flowers, J. S. Harvey, T. S. Harvey, F. L. Ifould, and J. Clucas.

ANNUAL REPORT.—During the past year the average attendance of members has been nine. Messrs. J. Bowman, F. Barritt, and J. Clucas were re-elected Chairman, Vice-chairman, and Hon. Secretary respectively for ensuing year.

SOURSOPS.—It was stated that if the ground is turned over wherever this weed shows any growth the result is very beneficial. When tilling for the crop, when practicable, the ground where the weed is worst should be the last turned over. Last season the soursops were found a good stand-by for stock.

AGRONOMY PLOTS.—Much interest was manifested in the published reports of the experiments carried out at the various public schools.

CROPS.—Red rust was reported in a heavy crop that had gone down, but was not visible in the standing crops. Some overgrown crops have blighted. Poppies are plentiful in the crops, particularly on manured land, the weeds generally seeming to appreciate the manure equally with the crop. Cape barley was recommended for pigs and as summer feed for turkeys. Lucern should be cut for hay now and then allowed to grow until it flowers.

Finniss, October 3.

Present—Messrs. T. Collett (Chairman), A. E. Henley, T. R. Sumner, W. S. L. Heath, H. Langrehr, S. Eagle, A. Willcock, W. W. Heath, P. Gooding, S. Collett (Hon. Sec.), and two visitors.

OFFICERS.—The Chairman and Hon. Secretary were re-elected and thanked for past services.

SEEDS, &c.—Seeds and potato setts were distributed to members who own suitable soils, upon condition that the produce of seed from these shall be redistributed.

CROP INSPECTION.—This meeting was held at Mr. A. E. Henley's, for the purpose of re-inspecting his drilled crops, which were pronounced by all to be very good. The oat crop, drilled with 5 pecks of seed and 1cwt. superphosphate per acre, will probably give 2 tons of hay per acre. The wheat crop is very good, considering the dry season, but rather lighter. The usual hospitality was encountered, and the host and hostess were thanked.

Pine Forest, September 27.

Present—Messrs. W. H. Jettner (Chairman), J. St. J. Mudge, J. G. Zilm, J. Flowers, and R. Barr, jun. (Hon. Sec.).

VISITORS.—The Chairman directed special attention to note in August issue of *Journal* re attendance of members and friends at Bureau meetings.

FIELD TRIALS.—The question of awarding money prizes at Bureau field trials and shows was discussed, and a motion in favor of the principle was carried.

CROPS.—Members inspected Mr. Mudge's wheat crop. A paddock of fifty acres of early wheat, manured with English superphosphate, was estimated to be worth four or five bags per acre. Strips in the paddock left unmanured were very striking contrasts to the rest of the crop. Mr. Mudge stated his intention of cutting about 150 acres with binder, and putting it through the header. Members were of opinion that a steam thrashing plant has become a necessity in this district.

Riverton, September 24.

Present—Messrs. H. A. Davis (Chairman), T. Gravestock, J. Kelly, A. B. Welch, C. C. Castine, W. Hannaford, A. Hannaford, H. A. Hussey (Hon. Sec.), and one visitor.

CROPS.—Members reported that the hot dry weather had had an unfavorable effect on the crops. Those on fallow are, however, looking well and very clean, while the manured crops are superior to those not manured. It was decided to make an inspection of some of the crops near Riverton in October.

Mount Gambier, October 15.

Present—Messrs. J. Umpherston (Chairman), M. C. Wilson, J. C. Ruwoldt, J. Dyke, J. Bowd, T. Edwards, T. H. Williams, W. Barrows, J. Watson, W. Mitchell, and E. Lewis (Hon. Sec.).

DAIRYING.—Mr. Edwards read from the October issue of the *Journal* accounts of butter yields from Holstein cows. Mr. Dyke said he had a half-bred Jersey shorthorn cow which gave 4.9 per cent. of butter fat, making 11lb. of butter from 17lbs. of milk. Another cow gave 11b. of butter from 20lbs. of milk, both giving about 2galls. of milk daily. The cows were grazing, and not fed on special feed. Considerable discussion ensued on the breed of cows most suitable for the district. Some favored the Holstein crossed with the ordinary cows, whilst others advocated the milking strains of Shorthorn; but it was pointed out that these were very difficult to obtain. The Jersey also met with favor, but several members considered it unsuitable for the district.

SOURSOPS.—This weed was reported to be growing in several parts of the district. Covering with straw and burning it was reported to be a failure. Sulphuric acid in water was stated to kill it. Mr. Collins thought stock would eat it, but several members stated they had never seen any touch it but pigs.

CONGRESS.—Mr. Ruwoldt reported on proceedings of recent Congress in Adelaide, and some discussion ensued on the various subjects dealt with. Some exception was taken to the attempt to legislate to fix the weight of the bag of chaff. Mr. Dyke said it seemed generally that best results were obtained from use of superphosphate. Mr. Ruwoldt said Professor Lowrie admitted that in the long run they would probably get more profitable returns from the use of green bonedust, but as superphosphate gave better returns at first it was most favored.

STOCK COMPLAINT.—By means of the microscope Mr. Williams, Inspector of Stock, showed the bacilli of tuberculosis and the eggs of the hydatid tapeworm. On one slide he showed living bacilli of tuberculosis from a badly-infested cow he destroyed a little while ago, the milk from which had been used by the owner's family, one of whom had died from consumption, and another was now affected. The udder and every gland of the cow in question was affected by the disease. The disease in the udder was not always noticeable, but if the udder is handled the nodules could readily be felt.

MOTHS.—Several members reported that there were large numbers of moths about at present, and fears were expressed that they portended a plague of caterpillars.

Angaston, October 15.

Present—Messrs. R. Player (Chairman), E. Thamm, P. Radford, A. Friend, W. Sage, F. Thorne, S. O. Smith, J. Vaughan, W. Sibley, F. Salter, A. Sibley, and E. S. Matthews (Hon. Sec.).

CONGRESS.—The various papers read at the tenth annual Congress were well discussed. It was decided to discuss the paper on manures at next meeting, when Mr. F. Salter will give a paper on the same subject. It was considered that a much cheaper method of protecting trees from birds than that suggested by the General Secretary, *i. e.*, covering with old fishing nets, was necessary, as none of the members have been able to utilise these nets for anything like the period mentioned by that gentleman.

MARBLE QUARRIES.—Attention was drawn to incorrect statement in October *Journal* to effect that only one marble quarry was now being worked in South Australia. In addition to the one mentioned, Mr. Sibley, of Angaston, has been working a quarry for years. [The General Secretary is not responsible for any portion of the *Journal* coming under the heading of "Industry." This is edited by the Secretary to the Department of Industry, who is responsible for the statements contained therein.—(GEN. SEC.)]

Mylor, October 22.

Present—Messrs. W. Nicholls (Chairman), P. P. Probert, F. G. Wilson, F. Rosser, A. Phipps, R. S. Mundy, W. T. Elliott, S. W. Jackman, E. J. Oinn, T. Mundy, W. G. Clough (Hon. Sec.), and nine visitors.

EXHIBITS.—Mr. J. Roebuck showed samples of White and Black Tartarian oats 6ft. 2in. high, also sand vetches and clover.

DAIRYING FOR BLOCKERS.—Mr. E. Wilson, Inspector of Homestead Blocks, read a paper on "The Cow on the Block," with special reference to the Mylor blocks. The following is an abstract of his paper:—

Generally speaking these blocks are suitable for fruit-growing, vegetables, and dairying. If the block, from its situation and soil, can be utilised to advantage as a market garden by all means use it so, but if the area of suitable soil is too small, or haulage of produce too costly, which is often the case here, do not attempt to grow vegetables for market. There is small chance of success if we attempt with second-rate facilities to compete with those not so handicapped, especially as our market for this produce is very limited and unreliable. Cow-keeping under the stall-feeding system is likely in such cases to pay better than market gardening. The blocker must, however, bear in mind that there is a wrong as well as a right place for the cow. One wrong place is on the road with the owner sitting on the fence watching the poor animal's attempts to obtain sustenance from the poor, scanty herbage on the roadsides. Another wrong place is in the owner's, or perhaps his neighbor's, vegetable garden or orchard. No man has a right to do anything that will work an injury to his neighbor, and there is probably no animal capable of doing more mischief in a garden or orchard than a cow or calf. Another wrong place for the cow is within the owner's fences climbing over the rocks and through the

scrub in search of food. The milk and butter yields from such cows will not be profitable. Still another wrong place is the small patch of rich swamp land that may be comprised in the block. The luxuriant growth of white clover and other feed almost submerged in winter will attract the cow, but the soil will not be improved by the puddling it will get during wet weather. If, then, the cow is in the wrong place outside the fence, on the hill, and in the gully, the natural inquiry is, "Where is her right place?" My answer is, "In the stall." Let us inquire for a minute or two to see how it can be done.

Whilst generally it will not pay to turn the block into a pasturage area, still, in exceptional cases, two or three acres might be successfully cultivated for the growth of hay for a stand-by. Where there is a retentive subsoil and firm topsoil a small grazing paddock might be prepared as a run for the cows by surface clearing, shallow ploughing, manuring, and sowing with various grasses and trefoils, especially native seeds. With these exceptions, however, cow-keeping on these blocks means intense cultivation. Not many of the blocks can boast of a piece of land an acre in extent of uniform quality and compact in shape; the portion fit for the spade is generally found in patches, small in area, irregular in shape, with different aspects, some lying warm, some cold, some wet, some dry, and we have to turn these apparent disabilities into real advantages, using the dryer patches for winter crops and the wet ones for summer, using the detached portions for a succession of small crops of fodder, avoiding a glut at one time and scarcity at another, introducing variety into the food of the cows, and also into the crops grown on the different patches.

Bare fallow is a term that should have no meaning for us; nature refuses to permit it; with our heavy rainfall it would be positively injurious, as the nitrates in the soil would be washed out in the absence of growing plants to absorb and fix it. Leguminous plants are especially valuable for this purpose. Nature does her best in this respect, speedily covering a piece of land from which a crop has been taken with any plants, the seeds of which are present and available for her to germinate, and trefoil plants are her especial favorites. Jersey kale, Chinese cabbage, kohlrabi, beet, parsnips, carrots, mangolds, wheat, barley, oats, rye, lucern, vetches, tares, clover, and other trefoils, peas, cow peas, pumpkins, and melons—the latter in any spare sandy spots—all might be grown for feed, and these might probably be supplemented with advantage by a little bran or copra cake.

Of course it goes without saying that the best results—that is, the largest crops in constant succession—can only be obtained by the highest cultivation, and the best results should always be aimed at, even for economy's sake, especially in our case, where the initial cost of preparing the soil is so heavy.

Manuring will play a very important part in the attainment of these best results, and here is one advantage of stall feeding. The manure from the cows can be made the most of, along with that from pigs, fowls, &c., and the human excreta also, used in the most judicious and liberal manner, and supplemented by phosphatic and potassic manures, and probably to some extent by lime and salt. The growth of food for the cows need not supersede or interfere with the growth of vegetables for the house; on the contrary, what would otherwise be waste product of the garden can be used as cow feed, and the growth of green crops will be actually beneficial to the potato and other crops. This brings us to what is often the hardest part of the cultivator's business, namely, the disposal of his produce. There are, however, not the same troubles to overcome in the disposal of the products of the dairy as with the produce of the orchard and garden. Private separators might be used in some cases, or co-operative separators set up at Mylor, Scott's Creek, or other centres would enable the cowkeeper to make the most of his milk, because he would not only have the cream to sell, but the skim milk fresh and sweet for the use of his family and for the stock. The butter could either be made by the blockholder's family or sent to town to a central factory. Possibly, if the industry were vigorously carried on, a butter factory might be established in the neighborhood.

In our selection of cattle we are confined within the limits of the practicable, and I suppose that at present, for most of us, pure breeds are outside those limits. Probably the best we can do is to secure for common use a pure Jersey bull, and each for himself get the best cows our means will allow, always remembering that the best is the cheapest in the long run.

Now, what about results? I do not wish to be understood as giving an expert's lecture, but as one of the blockholders in the neighborhood anxious to discover the best way to utilise my holding. In calculating the probable returns we have a right to take into account the value of other produce which cow-keeping helps us to obtain. It is said that a cow will keep a sow and her litter of pigs; that is, the skim milk available from the cows will make pig-keeping profitable, and by this means the refuse from the garden not relished by the cows, and from the orchards, can be turned into money; and between the rows of trees field peas can be grown with actual advantage to the trees, and these can be used for topping up the pigs. A portion of the skim milk can also be fed to a number of fowls, so that we may reckon the proceeds from all these as part of the returns from cow-keeping.

I suppose a good cow will eat about 8 tons of feed in a year, and give from 450galls. to 600galls. of milk, or 250lbs. of butter, and we may calculate that, with the help of the little haystack, the small grass plot, and an occasional roam in the scrub, with a little bran and copra,

and a little help from the carob and the tree lucern, the blocker should be able to keep four cows if he has one acre of good land, always bearing in mind that this result can only be gained by keeping good cattle, well housed and cared for, constant cultivation, no fallow, abundance of manure, carrying on a constant succession of small crops of different kinds.

On the basis I have mentioned I think we would be justified in looking for an annual income something like the following:—

	£	s.	d.
Produce of 4 cows, 1,000lbs. butter	50	0	0
" 4 calves, sold at 20s.	4	0	0
" 20 pigs, " 20s.	20	0	0
" 50 fowls, " 1s.	2	10	0
" 200 doz. eggs, sold at 9d.	7	10	0
	84	0	0
Less bran and copra account	6	0	0
	£78	0	0

Some would keep a larger, some a smaller number, but taking four as an average it should not exhaust all the time or energy of the blockholder, nor all the productiveness of the block. There is still the orchard, the patches of small fruits, herbs, flowers, &c. Poultry-keeping, for instance, could, I think, be followed with profit much more extensively than I have indicated.

I am quite aware that every blocker cannot, even if he chooses, start in at once at full swing upon the lines laid down; I know the difference between theorising and carrying out; I know it is easy to sit at a desk and teach the land cultivator what he ought to do; I also know that the possession or otherwise of a £10 note will make or mar very good plans.

I do not say that the calculations I have mentioned are correct; but I do think that the matter is worth considering, that we should each of us try and shape out a course, discover the best plan of action, and make all we do fit in with that plan. If we do this I think we shall many of us find that, with the help of a cow or cows, we shall be able to make better use of our blocks than we can without.

Clarendon, October 13.

Present—Messrs. A. Harper (Chairman), J. Wright, J. Juers, H. Payne, R. Hilton, J. Chapman, J. Spencer, A. L. Morphett (Hon. Sec.), and one visitor.

DAIRYING.—It was decided to arrange for lecture on this subject by the Dairy Instructor on November 9.

SOURSOPS.—Members stated this plant was introduced into the district as a garden plant, and is spreading to a considerable extent. It was stated that several other undesirable plants were beginning to appear in the district, and it was felt that some action should be taken to prevent them spreading. It was decided to have a circular drawn up, and get 500 copies of same distributed at once, urging landholders to take immediate steps to stop the further spread of soursops, poppies, and stagger weed. [Well done, Clarendon. This is decidedly a step that might with advantage be followed by other Branches. Simply sending out circulars will, however, not be sufficient. Personal advocacy and example by the members will be necessary in many cases. There can be no more forcible illustration of the truth of the old adage, "A stitch in time saves nine," than the way in which undesirable plants spread if left unchecked. The expenditure of a few shillings in destroying these weeds when they first appear will result in the saving of many pounds later on.—GEN. SEC.]

Yankalilla, October 21.

Present—Messrs. E. C. Kelly (Chairman), J. Grundy, H. Leverington, R. Lovelock, J. Butterworth, and G. H. MacMillan (Hon. Sec.).

MANURING.—Mr. Grundy read a short paper on this subject, giving his experience during the past two seasons of the effect of using manures. Two years ago he had twenty-three acres of wheat drilled in with 80lbs. English

super. per acre, leaving a few rounds unmanured, and increasing the quantity in places. The manured portion seemed to grow much better and stronger from the start, and stood out better. At harvesting, however, there was very little difference in the height, but the manured portion was thicker; in fact, for some time after the crop was cut the rows where the greater quantity of manure was used were very easily discernible. A top-dressing of super. on a small plot of broadcasted wheat had practically no effect. This year he had twenty-three acres of wheat and twelve acres Cape oats drilled in with super. and bonedust, 100lbs. per acre. He could see no difference between the effect of the two fertilisers, but both showed very distinctly above the few rounds where the fertiliser was shut off. He was a strong believer in drilling in the seed and manure together, and was confident that a fair quantity of a good fertiliser will prove a profitable investment. As they would see from the Congress report, there was considerable discussion as to whether the use of these commercial fertilisers would exhaust the soil, and those most competent had no hesitation in saying that, with a proper system of farming, they would not. He was strongly of opinion that the little super. he used was not the cause of all the extra growth. It seemed to him that by fostering the roots when young, and making the plant strong, the roots extended further, and went deeper in search of fodder, and consequently made use of extra supplies of plant food naturally in the soil. It was decided to discuss the paper at future meeting, to enable the members to judge of the results of the present season's experiments.

Koolunga, September 29.

Present—Messrs. T. B. Butcher (Chairman), J. Button, J. Butterfield, W. J. Jose, R. Jackson, J. Sandow, R. H. Buchanan, and G. Pennyfield (Hon. Sec.).

CONGRESS.—The Chairman gave an interesting report of the proceedings of the tenth annual Congress, and some discussion ensued. Arrangements for the management of the Jersey bull loaned to the branch by the Department of Agriculture were dealt with. Mr. Sandow tabled Profusion peas of fair quality grown from Bureau seed.

Orroroo, September 23.

Present—Messrs. J. Moody (Chairman), S. Roberts, E. Copley, M. Oppermann, W. S. Lillecrapp, J. Jamieson, and R. Coulter, jun.

SOURSOPS.—Members stated that there was very little of this weed in the district, and were of opinion that it was not likely to do much harm here.

MANURES.—Messrs. Lillecrapp and Jamieson reported on proceedings of tenth annual Congress, and both expressed the opinion that it was doubtful whether drilling in the seed with fertilisers would prove a success in their dry district.

SYSTEMATIC FARMING.—Mr. R. Coulter, jun., read a lengthy paper upon this subject, of which the following is the substance:—

In dealing with the subject under consideration I suppose that it is superfluous for me to attempt a definition of the term systematic. I presume we all have a system of our own, upon which we have or would like to work our farms. I say would like to, because it is not always practicable to start right away upon those plans. It often requires considerable time and labor, cash and patience to get into line. In the adoption of any system there is one important object to be kept in view, viz., the minimum of outlay for the maximum return. In farming, not only have we to consider such items as stock, implements, and labor, but land also, for whether freehold or leasehold it costs hard cash. We often overlook this and acquire a large area of land without the ability to put it to the best use, for I hold that one of the

principal features in successful farming is the use to which we can and do put the land. A man who out of 500 acres can procure a larger return, in proportion to the land he holds, than one who holds 1,000, given land of equal quality, is the more successful farmer, and the greater benefactor to the community. In outlining the system now advocated I shall confine myself to two points, viz., the sub-division of the land and rotation of crops, and the equalisation of the strength required to work that land. First, though, I will refer to two or three other systems now in vogue. There it what may be termed the "go-as-you-please system," that is of adapting the cropping of the land to prevailing circumstances and conditions, and no doubt there is much to be said in its favor; but whatever may be the merits of this system, there is always confusion. The other is what may be termed the "all-fallow system." This is advocated by many, but I believe practised by few. There is one great disadvantage in this, and that is the unequal distribution of the strength required to work the farm. The fallowing is by far the heaviest part of the year's operation, and to ensure the destruction of rubbish with cultivation for the penetration of the atmosphere after ploughing it is out of all proportion with the strength required, compared with the amount needed for the rest of the year, and the time at our disposal. I have arrived at the conclusion that the extra cost involved, with the possibility of failing to cover the amount of work required, would outbalance the advantage expected from all fallow land.

My aim from an economical standpoint would be (other things being equal) to arrange the working of the farm so that about the same number of horses would perform the work of each season of the year. I propose to divide the farm into five paddocks of as near as possible equal size. Take, for example, a farm of 800 acres, devote fifty for the homestead, comprising garden, small paddocks or plots for growing root crops and other fodder outside of that usually comprising the farm production, that will leave 750 acres, or five paddocks 150 acres each. Out of the five sow three, or 450 acres, each year, two of which would be fallowed and one stubble, the whole worked under the following rotation:—We will say for the first year paddocks 1, 2, and 3 were under crop and 4 and 5 under fallow; the second year 3, 4, and 5 under crop and 1 and 2 fallow; the third year 5, 1, and 2 under crop and 3 and 4 fallow, and so on. Each paddock would be fallowed twice in succession, and the third crop stubble land. Two reasons commend this system of rotation to my judgment. The cropping will not bring any undue strain upon the productive capabilities of the land, especially in the North, where the land sometimes takes a rest on its own account. Three crops in five years is not heavy cropping; indeed, as I will show directly, it will be less than that, and the cost of a larger quantity of land would be avoided for equal results, and also this system of rotation can be worked with about the same strength the year through. Taking the same size farm as our basis, I believe it could be worked all through with seven horses and one hand to assist, with the exception, of course, in the harvest, when more hands would be required. The operations of a farm can be divided into three parts—fallowing, sowing, and harvesting. In the order of working fallowing comes first, but it will serve my purpose best to refer to the sowing. We assume that the work of storing chaff and straw is finished not later than the end of January; the next two months will be devoted to preparing the land for the seed. The first operation will be to plough the stubble paddock of 150 acres with five horses and a three-furrow plough; this can be done in about six weeks. There will then be two spare horses at liberty for any small work that may be required to be done. Indeed, if it were thought advisable to cultivate any of the fallow land those two could do all the chaff and straw carting, but unless there has been heavy rain since the fallowing season closed I do not think there is much to be gained by working the land before sowing. However, whichever course is adopted, both cultivating and ploughing could be finished by the middle of March. Everything will now be ready for sowing; without any difficulty this could be done in about three weeks. The implements required would be a seed-sower and one 6ft. set of harrows worked by two and five horses respectively, or, if drilling were preferred, it would require two drills to cover the same ground. Some will possibly take objection to the two drills. If I adopted the drills I would sooner go to the extra cost and ensure having the seed in in good time. The sowing should not be later than the 20th of April.

Having concluded seeding the time for a "spell" has come, not only for man, but for beast as well. If your help wishes to go for a fortnight's holiday let him go, but pay his wages all the same. The horses will benefit from a cessation from the continuous hauling involved in farm work, or even should they be put to some other kind of work it will be a relief. Should there be any stones to gather, gather them now. The year's supply of firewood should be procured, and any other miscellaneous work carried out. Having disposed of these matters, our attention is turned to fallowing. Between sowing and harvest there is a rule from five to six months. To turn over 300 acres will, with a three-furrow plough and six horses, take about twelve weeks; to scarify the same will require about five weeks, and if thought necessary to harrow the land before the scarifier, two weeks' extra work would be entailed. This as a rule would be quite sufficient cultivation under ordinary circumstances for the fallow season. I would here remark that an implement is badly needed that will do the work better than a scarifier. This implement is useful for loosening the soil, but one is needed that will

do the same amount of work and at the same time turn the soil completely over, so as to insure burying the weeds and also open the land to the atmosphere. From a financial point of view the harvest is the most important part of the year's work. It is from that we receive the wages of our labor. Our aim is to make the most out of it that we can. What we term "hay harvest" is the first part of harvest work, either for sale or for use. I would cut for fodder all the stubble paddock either preserved as ensilage or hay, or both. I would do this for two reasons. First, I firmly believe that any land that will pay to cultivate at all will pay to cultivate for fodder in preference to keeping it for grass. Nearly the same conditions that affect wheat-growing will affect grass; unless there is an early season that fails at the finish there is a scarcity of grass whenever the wheat crops fail. When there is an abundance of grass, especially for two or three years following, there is the temptation to overstock, or else special dealing has to be resorted to, and unless a person has had some considerable experience in stock dealing he is as likely to lose as gain by it; or else again the grass is wasted. If the land is cultivated the crop, if abundant, can be preserved and kept for seasons when fodder is scarce, and so enable us to keep an even number of stock without having to sell, as is often the case, at a loss, when pressed by a scarcity of feed. The second reason is because a crop cut for hay is calculated to draw upon the productive power of the land only to about one-half the extent that a crop allowed to mature would do, thus still reducing the draw upon the land, making the cropping one-half less than indicated in the rotation referred to, being equal to two and a half crops to two fallows. With the fodder thus cut I would feed the stock, instead of running on grass, and I believe with better results. The other two paddocks would be for wheat. If I could purchase a threshing machine I would cut all, or as much as possible, of the one that would be in crop next year with a binder.

I am not yet satisfied as to the advantage of the header. The other I would harvest with the reaping machine. The operation of each paddock would fit fairly well one into the other, all that would be required being additional hands. The three paddocks as they were cleaned would be available for the stock, and although there would not be a great quantity of food on them, especially the one cut with the binder for wheat, it would be a benefit to the stock, giving them freedom and exercise. There would thus be an open run for the stock at least nine months in the year—from when the hay paddock was cleared to when the last paddock was fallowed. I would make it a point if possible to burn the straw on the paddock reaped by the stripper before the season was too far advanced. A good burn once in three years would benefit the land, and thus benefit me more, perhaps, than the straw would.

In the system I have attempted to outline I believe there is a possibility of an all-round farm, wherein all the minor parts or auxiliaries attached to wheat-growing could be carried on with a greater amount of certainty, both as regards the practicability and cash returns, than under the system of adapting the cropping to the conditions prevailing at the time. If dairying were adopted it would be an incentive to procure and keep only good cows, as they would have to be fed, and a farmer feeding his cows on valuable fodder would soon realise that to feed poor ones would not pay. System in cropping would tend to system in all other things. (One would be, to some extent at any rate, the outcome of the other. There is the possibility of variation consequent upon the changing conditions and other considerations, late or dry seasons, waste land, &c., but as a system I believe it could be worked with advantage. Of course a larger area would require more strength and machinery, a small area less. Seven horses would work a farm of the size indicated, and sometimes one to spare, all the year through. Stable-fed horses can do more work, both as regards strength and time, than horses turned out to care for themselves, and certainly will last longer, and I think I can say without as great a risk of loss. There will be time, labor, and cash saved, to say nothing of temper, by systematic operation, whatever that system may be.

Orroroo, October 21.

Present—Messrs. E. Copley (Chairman), S. Roberts W. S. Lillecrapp, R. Coulter, jun., G. Matthews, W. H. Roberts, R. Coulter, sen., and T. H. P. Tapscott (Hon. Sec.) and one visitor.

FARMING.—Paper read by Mr. Coulter, jun., at previous meeting on "Systematic Farming" was well discussed. All members advocated working on a system, whether it be farming, dairying, grazing, or other occupation. They approve of sowing only fallow land; the land being very dirty, a crop cannot be relied on except on fallow. Sowing should not be later than April. Early sowing as a rule has proved better than late sowing. To make a profit the farmer must go in more for grazing with wheat-growing than has been the practice in the past.

Norton's Summit, October 1.

Present—Messrs. J. Jennings (Chairman), J. J. Bishop, A. Smith, J. Hank, and W. H. Osborne (Hon. Sec.).

CURL-LEAF ON PEACH TREES.—The Chairman read a paper on this subject, in which he questioned whether it is a disease, and advanced the opinion that it is caused by sudden changes of temperature after the trees have put forth young leaves. He had noticed curl-leaf to appear this season immediately after cold S. and S.E. winds on 18th, 24th, 29th, and 30th September. The trees mostly exposed to those winds were the worst affected, and if further seasons bore out his ideas he should consider his theory reliable. Elberta was the most seriously affected. Two trees on plum stocks were scarcely affected either with aphid or curl-leaf. [With the aid of powerful microscopes, scientific and practical fruitgrowers, distinctly appointed to inquire into the cause of curl-leaf in peach, plum, and other fruit trees, have discovered a parasitic fungus in every case where the disease has occurred in the form known in this colony. The fungus has been named *Exoascus deformans*, and it has been drawn and illustrated time after time; there is no doubt whatever upon this matter, but it is true that favorable climatic and other conditions will aid in the spread of the curl-leaf disease.—GEN. SEC.] Mr. Jennings next gave particulars of observations of peach trees last season, as follows:—

Thirty-first row.—Muir, no curl, no aphid; Nicholl's Orange Cling, robust, no curl, almost free of aphid; Early Crawford, no curl, very little aphid; Conkling and Globe, no curl, aphid not bad; others unknown, free of curl. Twenty-ninth row.—Wheatland, little curl no aphid. Thirtieth row.—Elberta, little aphid, plenty of curl; Merri-merri, no curl, very little aphid. All banded with mastic to prevent insects crawling up stems.

Alexander and Amsden's June on plum stock, free of aphid; High's Early Canada, not on plum stock, planted between the two former, was not free of curl-leaf, and was very bad with aphid. Think plum stock dwarfs too much. Believe curl-leaf does little harm, as it drops off as soon as settled warm weather sets in. The trees should then be gone over, and the growth regulated.

Mr. Jennings then quoted a part only of some remarks made by Mr. George Quinn in the *Journal of Agriculture and Industry*, as follows:—

I have seen peaches with the foliage literally blue, and yet the curl-leaf did not appear checked, and ran its course of blistering growth until the leaves fell from the trees.

A few lines previously, in the same article, Mr. Quinn wrote:—

I have no hesitation in asserting that the establishment of this practice alone in orchard work is in itself ample justification for the existence of the Agricultural Bureau. I am perfectly aware that many practical orchardists are not yet fully convinced of its value . . . But as it has been proved absolutely by scientists that the solutions of Bordeaux mixture, as used for spraying, will destroy the germinating power of the spores of the above-named fungi [Amongst them being *Exoascus deformans* or "curl-leaf."—GEN. SEC.] when they have been enveloped in it, I do not think it is necessary to enter into a controversy on this point.

And a very few lines later on, just following the portion quoted by Mr. Jennings, Mr. Quinn mentioned the principal causes of failure to secure satisfactory results from application of Bordeaux mixture, and the failure quoted from Mr. Quinn's article on Bordeaux mixture by Mr. Jennings was simply the result of applying the dressing too late in the season. Lower down in the same article Mr. Quinn says, "I have made careful inquiries from those who have tested the mixture thoroughly and practised its use the greatest length of time in our colony, and they all agree that a strong dressing, *when the buds are opening*, is the most efficacious." This matter has been referred to Mr. Quinn, who says, "I know of no fungus disease attacking fruit trees that is more readily controlled by the use of strong Bordeaux mixture, at the right time, than curl-leaf of the peach and nectarine (*Exoascus deformans*)."

Mr. Jennings next quoted Mr. Geo. Neilson, F.L.S., who stated at the New Zealand conference of fruitgrowers in 1897, that after thirty years' experience in spraying for peach curl he had found it useless. Mr. Thos. Moore, F.L.S.

curator of Chelsea Botanic Garden, in his work on peach-curl, stated that blistered leaves are occasioned by cold. There is no cure. The preventive is, of course, warm covering. The leaves that are most affected should be taken off at once, as well as those partially affected, so as fresh healthy foliage shall be produced when warm weather sets in. He considered the soil both of England and America to be uncongenial to the peach root. The French prefer the hard shell sweet almond for stocks, but in England the plum stock is mostly used. Downing wrote, "Although peach-curl does not appear to materially injure the tree or crop, it greatly disfigures it for a time." *Re aphides*, Mr. Jennings said the winged form appeared far more numerous at the start than is usual. There was a parasite which apparently deposits eggs in the body of the aphid, for some were found eaten out.

BANANAS.—Members of this Branch consider that fumigation of bananas will be no protection whatever against introduction of fruit fly.

INSPECTORS OF FRUIT.—Members of this Branch consider it would be unadvisable to detail the chief inspector on lecturing work in distant parts, and relegate his duties in the old fruit-growing districts to new men who have not acquired experience in detecting diseases of plants and fruits.

FIGHTING PESTS WITH NATURE'S WEAPONS.—It having been stated that New South Wales has received from the United States of America, and also from Cape Colony, a large number of varieties of ladybirds, &c., which feed upon and keep in check several species of aphides, coccids, and other insects, it is felt by this Branch to be desirable that some efforts should be made to secure the introduction of similar beneficial insects to this colony.

Mount Bryan East, September 24.

Present—Messrs. W. Brice (Chairman), E. T. Prior, J. Honan, R. Webber, H. Wilkins, T. Wilks, T. Best, W. H. Quinn (Hon. Sec.), and one visitor.

MANURING.—Mr. Wilkins read paper by Mr. Correll on this subject as read at Tenth Annual Congress, and some discussion ensued. The Chairman tabled wheat plants from same paddock, some from seed drilled in, and others from broadcasted seed. The former was decidedly in advance of the latter.

BUTTER RECORD.—Mr. Wilks wished to know the record yield of butter from one cow in one week.

Mannum, October 28.

Present—Messrs. O. A. P. Faehrmann (Vice-chairman), J. Walker, A. Schulze, B. Baseby, R. L. Herbert, J. E. Schulze, S. Hauesler, C. Hauesler, Dr. Minchin, O. Lenger, Hy. Brown (Hon. Sec.), and five visitors.

THE BEST MEANS OF HARVESTING.—Mr. Faehrmann read a paper upon this subject. The following is the substance:—

These remarks refer chiefly to the Murray Flats. He believed the old stripper would always be used on South Australian farms to some extent, and much of our land could not profitably be worked without it. It is very easy to manage, is durable, and costs little to maintain in good repair. It can be worked on stony ground and where roots prevail, and will gather in a harvest when other means would fail, or where it would be too thin and poor to gather by any other means. But it has the drawback that it gathers only a small part—though it is, perhaps, the most valuable portion—of the crop, leaving the straw on the field. It should be the aim of the farmer to gather in *the whole* of his crop. He said "perhaps" advisedly, because they would remember that the wheat in 1894 realised 1s. 6d. per bushel, and less for bleached grain. If farmers could have foreseen the drought that was to follow they would have realised that the straw was far more valuable than the grain. Many of them are poor to-day because they failed to gather in their straw, and lost their live stock through starvation; but if this has shown them the error of their ways the lesson may, after all, be a profitable one, because it will teach them to provide during years of plenty for the years of scarcity that

are sure to follow. There appears but one way to do this, and that is that every farmer should have a string-binding reaper. It is not a question of binder *versus* stripper, because both machines should be kept and both used. The binder should be put into the crop first, and later on the stripper can be worked with advantage. Perhaps 100 acres could be cut with the binder before the stripper could be put to work; the grain would be of good quality, and so much of the crop is secured against loss by fire or otherwise. Both machines will cut about an equal acreage per day. The sheaved crop can be stooked, or stacked if preferred, until the rest is harvested, and then thrashed or headed. He did not believe it would pay to thrash much with the header, as it is wasteful, and if stacked in bulk it would attract mice, which would spoil it. The best plan would be to thoroughly thrash the crop with a machine, as they used to do thirty to forty years ago, when the reaphook and sickle were in vogue, and when the thrashing machine went from one farm to another. If we could get a less costly but equally effective machine now it would be a distinct advantage—one to thrash, clean, and bag the grain and elevate the straw. Such a machine might be out of the reach of an ordinary farmer, but a few could combine to secure one, and every one could then provide a good stack of straw, which in this locality is of higher nutritive value than it is in the hilly districts; besides, it is more brittle, and breaks up more in thrashing, causing greater labor in hand-shaking to separate the grain. Therefore a machine would be better for thrashing in this neighborhood.

Hahndorf, October 15.

Present—Messrs. A. von Doussa (Chairman), C. Jaensch, F. H. Sonnemann, H. Spochr, H. Kerr, A. L. Paech, C. Bom, G. Sandow, T. Grivell, and D. J. Byard (Hon. Sec.).

BUSINESS.—Several members promised to attend Conference of Hills Branches at Mylor on October 25. The Hon. Secretary distributed seeds for trial, and impressed on members the necessity for keeping a record and reporting results to the Branch. Mr. Grivell reported as follows on last season's trials:—*Kleckley Sweet Watermelon*—A large variety; green skin; nice red flesh; does better on the plains; fruits up to 29lbs. weight. *Hungarian Honey Melon*—A good cropper; fruits small but very sweet. *White Gem Watermelon*—Fairly good.

Amymton, October 20.

Present—Messrs. Joseph Gum (Chairman), A. Gray, H. Turner, J. Burley, James Gray, John Kelly, W. Mills, S. Thomas (Hon. Sec.), and one visitor.

PAPERS.—At previous meeting Mr. Joseph Gum read a paper on "Mixed Farming," which was well discussed. Mr. A. Gray initiated a discussion on "How to Provide for Dry Seasons," in which most of the members took part.

DAIRYING.—Some discussion took place on dairying, and arrangements were made for care of the Jersey bull promised on loan by the Department of Agriculture.

Branch Show at Bowhill.

The combined show of the River Murray Branches of the Agricultural Bureau, comprising Bowhill, Swan Reach, Forster, Pyap, Lyrup, and Albert, was held on September 29, at Bowhill. There was an attendance of between 600 and 700 people. A fair number of entries were received for each class, and most of the exhibits were good. No money prizes were given, certificates of merit only being awarded. Trials of machinery were made where facility offered, and awards made according to their practical utility. The committee were congratulated on all sides on the success of their first show, which promises to be better still next year.

THE VINEYARD.

NOTES AND HINTS FOR NOVEMBER.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

Written for the "Journal of Agriculture and Industry."

[Received too late for insertion in usual position. —ED.]

The Soil.—The rain which visited us during the end of last month renders it necessary to run the scarifiers over the vineyard again, so as to break up the surface crust and loosen the soil. Wherever cuttings have been planted out instead of rooted vines it is advisable to go round them and carefully loosen the adhering soil, so as to enable them to expand and grow freely.

Grafts.—Grafts should be visited and carefully disbudded wherever necessary; roots growing from the scions should at the same time be removed.

Sulphuring.—The vines are blossoming rather early in the season this year, and it becomes imperative to proceed rapidly with the sulphuring to prevent the development of oidium on the flower bunches. Sulphur in no way interferes with the setting of the fruit; in fact, if anything, it renders it more certain and regular.

Night Caterpillars.—Those whose young vines have been attacked by these pests are advised to have recourse to the bran and Paris green remedy. About a tablespoonful of the following mixture placed round the vines will be sufficient to kill them: Bran, 30lbs.; Paris green, 1lb.; treacle, 5lbs.; water, 1gall. to 2galls.

Pinching Back—Pinch back the growing tip of varieties that do not set their fruit well. Do not top.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Working of the Factory Act.

By AGNES MILNE, INSPECTOR.

As the *Journal of Industry* is now successfully launched, it may be interesting to have a few notes on the working of the Factory Act from a woman's standpoint.

Workers will well remember some few years ago when factory legislation was in the air how terrible some of our citizens thought it would be that employers of labor should submit to the yoke of a law as regarded to the regulation of business and how they might conduct their establishments. But when there was such an agitation about low prices and sweating that existed in this clean and very good city of Adelaide those who sympathised with the workers were filled with indignation, and said, we must have the factories regulated by law, as in other places. Others deemed that a better state of things could be brought about by interference by the Legislature. But what are the facts?

Before the Factory Act of 1894 came into operation several young girls were working in a galvanized iron shed, about 12ft. x 16ft., with boards placed across the rafters to keep the heat of the sun from their heads. They worked in that place all the summer.

What is found to-day through the enforcement of the provisions of the Factory Act? These same workers now occupy a large and comfortable workroom, with plenty of light and ventilation, also good lavatory and sanitary accommodation—things that were never dreamed of as necessary by many employers for the health and comfort of their employes under the old system. How truly is evil oftentimes wrought from want of thought more than want of heart.

Again, in the case of females or young persons, any employer might with impunity work their employes all hours of the day or night, and with very small or no remuneration whatever. Now the law is that no woman or young person shall be employed in a workroom or factory for more than forty-eight hours per week: but on notice to an inspector may be employed for not more than sixty hours in any one week. Provided that the aggregate number of hours do not exceed one hundred hours in the year. This alone is a great boon to the female portion of the community.

From a mother's standpoint I maintain that the crowding of our young women into the vitiated atmosphere of factory and workroom so young is not only detrimental to their moral and spiritual well-being, but also from a physical point of view. History tells us that the Emperor of the French asked the question, what is it the world needs to day? And the answer came back to him, "mothers." And, again, if it is true that the hand that rocks the cradle moves the world, then let there be by all means healthy mothers, and where are these to come from but from pure and healthy girls?

All honor is due to those legislators who so strenuously pushed forward and secured the passing into law of our Factory Act, and the one, but by no means the least, is the forbidding of long hours of work for our young women. The Act might well be amended so as to prevent any girl entering upon any any trade or business until she has reached the age of 16 years, and has passed the compulsory standard required by the education laws.

An investigator of woman's work knows full well that what most handicaps women is their general deficiency in industrial capacity and technical skill. Where the average woman fails is in being too much of an amateur at her work and too little of a professional.

This to a large extent would do away with illegitimate competitors. The real enemies of the working woman are not the men, who always insist on higher wages, but it is the amateur of her own sex. So long as there are women (married or unmarried) eager and able to take work to their homes, and do it in the intervals of another business, domestic service, or home duties, the true workers will never disentangle themselves from the vicious circle in which low wages tend to bad work, and bad work compels low wages.

In a future article the question of women's work and the evils of sweating will be discussed.

An Imperial Legal Case Affecting Labor.

Referring to an article in the last number of this *Journal*, *re* unfenced, dangerous machinery, the following case reported in the *Law Times* of July 2, 1898, will be interesting to both employers and employés.

Groves v. Lord Wimborne.

Court of Appeal.—Before Smith, Rigby, and Williams, L.J's., June 28. Counsel—Thomas, Q.C., for plaintiff; Williams, Q.C., for defendant.

Factory—Statutory duty to fence machinery. Breach—Penalty, fine.

Right of action for damages.—“The Factory and Workshop Act, 1878” (41 and 42 Vic., c. 16), s.s. 5, 81, 82, 86. “Factory and Workshop Act, 1891” (54 and 55 Vic., c. 75).

By the Factory and Workshops Acts, 1878 to 1891, all dangerous parts of machinery in a factory must be securely fenced, and all fencing shall be constantly maintained in an efficient state, while the parts required to be fenced are in motion. If any person is killed or suffers any bodily injury in consequence of the occupier of a factory having neglected this duty, the occupier of the factory shall be liable to a fine, which may be recovered in a court of summary jurisdiction, not exceeding £100, the whole or any part of which may be applied for the benefit of the injured person, his family, or otherwise, as the Secretary of State determines.

Where the offence for which the occupier of a factory is liable under the Acts to a fine has in fact been committed by some agent, workman, or other person, such agent, workman, or other person shall be liable to the same fine as if he were the occupier; and the occupier has power to exempt himself from fine on conviction of the actual offender.

The plaintiff (Groves) in the present action was employed at the Dowlais Ironworks, near Cardiff, which is a factory within the meaning of the Factory and Workshops Acts, 1878 to 1891. On the 21st July, 1896, the plaintiff was engaged at work at a steam winch, over the wheels of which there was not on that day any efficient fencing. Whilst at work his hand was caught between the cogs of two of the wheels and he was severely injured.

He thereupon commenced the present action to recover damages, alleging as a ground of action the breach by the defendant of his statutory duty to maintain the fencing of the machinery in an efficient state. Defendant contended that no action would lie for the breach of this duty, for which the Act creating the duty had provided a special remedy to be recovered in a court of summary jurisdiction.

At the trial before Judge Grantham, with a jury, the learned judge held that no action lay, and he thereupon gave judgment for the defendant, but at the same time he took the verdict of the jury, who assessed the damages suffered by the plaintiff at £150.

The plaintiff appealed.

Held that looking at the whole object and scope of the Factory and Workshops Acts, 1878 to 1891, the intention of the legislature in providing for the

infliction of a fine for a breach of duties created by the Act was not to deprive a workman of the right which *prima facie* he would have to sue for damages for personal injuries caused by a breach of such duties. The action was rightly brought, and judgment must be entered for the plaintiff for £150.

Appeal allowed.

Labor Bureau.

The Government Labor Bureau central office is now established in one of the rooms belonging to the department of the Superintendent of Public Buildings, the newly appointed bureau clerk, Mr. Richardson, being transferred from the Public Works ministerial office on the 1st of October.

Up to the 17th instant 565 men were registered.

An agency was established on the 14th at Gulnare under Mr. Lawson, of the Engineer-in-Chief's Department, to register and engage men camped there waiting for the Bundaleer waterworks to be started.

In the *Police Gazette* of the 19th instant, under instructions from the Government, all police officers in charge of country stations were appointed agents for registering names of unemployed, so as to avoid compelling men to travel long distances to register.

The Bureau on the 17th instant dispatched thirty men to the Bundaleer waterworks: all these men were specially selected as the most suitable of those presenting themselves in reply to the notice that men were required. Out of the thirty men selected, three backed out on various excuses before the 17th, and one who had signed and agreed to go did not appear at the railway station. The Gulnare agency selected twenty men for the same waterworks.

Twenty men were selected on the 17th instant for Nectar Brook; but out of the twenty, five have not turned up at time of writing.

The greater number of the men registering at the Central Bureau can never expect to be employed where a fair day's work with pick and shovel is expected and exacted; even granted their willingness, a large proportion of them are physically incapable of doing a fair day's laboring work.

In answer to a private application from the South, two men were selected and sent down for wattle-stripping.

Attached will be found a list showing classification of registered men.

Total Number registered up to and including Monday, 17th instant.

Carpenters	23	Tailor	1
Painters	5	Clerks	3
Masons	2	Storekeeper	1
Plasterer	1	Electroplater	1
Bootmakers	6	Grocers	4
Bakers	4	Coachpainter	1
Fitters and turners	2	French polisher	1
Confectioner	1	Soapmaker	1
Blacksmiths	17	Compositor	1
Bookbinders	3	Plumber and ironworker	1
Enginedrivers	4	Accountant	1
Brassmoulder	1	Ironmoulders	3
Boilermakers	6	Lithographer	1
Saddler and harness makers	3	Coachtrimmer	1
Butchers	2	Sanitary work	1
Cooks	2	Laborers	454
Brickmaker	1	Sawyer	1
Gardeners	2	Printers	2
Maltster	1		
		Grand total	565

Dispatched to Bundaleer	30
Nectar Brook	20
Bark-stripping	2

C. E. OWEN SMYTH, Superintendent of Public Buildings.

The Bicycle Trade.

BY INSPECTOR BANNIGAN.

Few industries can lay claim to the phenomenal growth that has attended the bicycle trade during the last few years, not only in South Australia, but throughout the civilised world.

The great popularity of this means of locomotion has brought into existence dozens of bicycle shops, where the machines are manufactured from parts imported from England and America. Like clocks and watches, bicycles are also liable to go out of order, and an opportunity is thus afforded to the blacksmith, and in fact Jacks-of-all-trades, to set up as bicycle repairers, and in time figure as full-blown manufacturers. It in consequence often happens that a very indifferent blacksmith undertakes the more delicate work of the bicycle trade with the utmost complacency, and through want of skill injures a good article under pretence of effecting repairs.

Machines equal to, if not superior to any imported, are manufactured in South Australia, but there is a tendency to encourage cheap production, and this leads to shoddy. Men with no mechanical knowledge set up in the trade, get their brazing done by a jobber at a miserably low price, and turn the machines out as their own make. Cheap work generally means that double the amount must be got through in order to live, and this does not tend to ensure careful workmanship in an article where safety to life is of the first importance.

Boys, too, are to a great extent employed as a further means of cheapening the labor, and this also in time tells its tale in the direction of inferior production.

The importation of machines during the last few years has been enormous, and a gradual cheapening of the best makes has been the inevitable result. There is no doubt that the prices charged here, as compared with those in England and America, leave a big margin of profit for the importer or local manufacturer, but the keenness of competition limits the number that each dealer can dispose of, and in consequence large profits are necessary to keep the interest paid on money expended in dead stock.

When the price has settled down to a fair level, and the great number of unskilled hands now in the trade have turned their attention to something they understand a little more about, the business will become an important and profitable one, not only for the manufacturers alone, but for the colony at large.

Locally-manufactured tyres are steadily advancing in favor, and this too will in time open up a new field of industry, and the demand for shoe leather may become lessened in proportion to population. The increase in the sale of bicycle tyres will to a certain extent tend to maintain a sort of trade equilibrium.

The Tanneries of West Torrens.

In Hindmarsh and Thebarton there are fifteen tanneries, the largest being of the well-known brand J. R. & S. over A.

There are about 8,000 hides of different weights—say 30lbs. to 40lbs. salted weight—and 10,000 skins of various sorts tanned and dressed in these factories per month, the skins comprising calf, kangaroo, wallaby of all classes, and basils, or sheepskins.

The hides are limited in supply in South Australia, and large quantities are imported from the eastern colonies, Western Australia, and New Zealand. The skins manufactured are the production of this province.

Trade is at present only fairly good, but in the event of an abundant harvest business will increase in all lines of this trade. The *Australian Trading World*, published in London in September, reports that the demand for leather was

rather better, without any alteration in prices; and the *British Australasian* just to hand states that Australian and New Zealand basils have been in more request, and prices dearer.

Wattle bark (the broad-leaved species, *Acacia pycnatha*) is the principal tanning agent, and in conjunction with it Valonia nuts from Smyrna (so much appreciated by the English farmers), myrabolams from India, and sumach from Sicily, is the material used for the finer qualities of goods.

The Australian leather exported to England is meeting with a ready sale, and, in order to counteract a prejudice existing in London against Australian leather and the use of mimosa bark, the Government are sending samples of South Australian manufactured leather to England to show to what a state of perfection our leathers have been brought by colonial intelligence and industry.

Three hundred men and boys find profitable employment in the above factories, which are principally working full time on union rules.

Port Pirie: The Broken Hill Proprietary Company, Limited.

The great re-arrangement entailed by the transfer of all the smelting operations from Broken Hill, New South Wales, to Port Pirie, has been successfully carried out, and the furnace plant has been erected on the company's property, consisting of smelters, roasting plant, and refinery, which adjoins the wharves at the seaport.

There are 11 smelters (8 of 120 tons, 3 of 80 tons), 4 "Ropp" roasting furnaces, 9 softening furnaces, 10 zincing kettles, 5 refining furnaces, 5 market kettles, 4 liquidation furnaces, 1 four-bottle gas retort, 4 four-bottle direct firing retort furnaces, 8 cupel furnaces, 1 retort dross furnace, 1 antimony dross furnace, 1 antimony blast furnace, 4 silver resmelting furnaces.

The minerals operated upon are lead-silver, oxidised ores, and sulphide concentrates from the mine at Broken Hill. The flux used in smelting operations is limestone and ironstone, procured in the province. Owing to the long-continued drought and the increased price charged by the Government for Beetaloo water, a seawater condensing plant, capable of supplying the requirements of the company, has been authorised by the directors. This important adjunct will enable the work to proceed independent of the reservoir supply.

About 1,000 men are employed in the smelting and refining works, working continuously in three shifts per day.

The demand for silver has been steady, whilst the lead market for the East has improved.

Port Pirie is making such headway that it will soon become the hub of the northern areas, and unquestionably the Metropolis of the North.

The South Australian Portland Cement Works.

Brighton has once more come into prominence, but this time with an industry that will last for all time. This is the place where, some years ago, it was proposed to construct the outer harbor. Everything on the spot ready to be utilised, and from the cavities in the heights from which the stone was to have been excavated batteries could have been constructed to defend the harbor from hostile attack.

But the local industry which now demands attention is the manufacture of *cement*. The South Australian Portland Cement Company have now firmly established their works at Brighton.

The output of the factory averages about 100 tons per week. The cement is sent out chiefly in bags, in accordance with the English practice, but where it is desired it is packed in iron drums similar in construction to those used in Germany for export. For making these drums English sheet iron is used, which is cut to the required size and curved and riveted on the works.

The cartage of the cement and the coal, &c., to the works is done by local contractors, the teams used varying from one to ten teams per day.

Fifty to sixty men are regularly employed, and the factory is worked on the eight hours system.

The carting, supply of stone, and the kiln work is, as far as possible, carried out on the contract system.

The enterprise is a "local industry" in every sense, the only material imported from Europe being the sheet-iron for the packages; all the rest comes out of the earth.

Mintaro Flagstone Trade.

Referring to the article in last *Journal* on the marble and slate works further particulars of the Mintaro quarry works have been obtained. The average output of Mintaro flagstone for the past year was 80 tons per month. It is principally exported to the colonies of Victoria, New South Wales, and West Australia. Fifteen to twenty-five men find employment. The railway profits by the carriage of the material to Port Adelaide. The flagging now being put down in King William street, Adelaide, is obtained from Mintaro quarries.

Work by Our Aborigines.

After taking away the country from the original possessors of the soil, destroying their hunting grounds, exterminating their game as vermin, and, as a result of our higher civilisation, changing the color of numerous additions to the black family circle, surely there should be no jealousy amongst "white men" when at shearing time the natives are employed at a few stations to shear the sheep and to wash their fleeces.

At Hill River Station thirty-six men and four boys from the mission station, Point McLeay, in charge of an overseer, are again employed shearing, baling, and preparing the wool for transmission by railway. These men pay their own railway fares and work on union rules. The natives at Point McLeay are also washing 130 bales of locks sent from Poltallock Station on the lakes. They have also shorn the flock of the mission station, which this season only yielded thirteen bales. Last year they earned £145 for washing wool. They also earn money by wattle-stripping.

Lately two of the natives built eight boats for the Government, to be used for river work, for which they were paid £48. Bootmaking is also carried on, seven men being constantly employed in the workshops. Three of these men, skilled hands, could hold their own in any factory in Adelaide.

From twenty to thirty men now hold land under homestead and other conditions, and the natives, both men and women, are registered and entitled to exercise the franchise in electing members of Parliament.

At Wellington Lodge, Lake Alexandrina, the blacks are assisting with the shearing, women and boys taking the wool from the shearers, and even when toothless, so that they cannot shear, one very old woman, lubra Louise Karpennie, is still able to do a day's work at woolsorting.

At the Point Pearce mission station a considerable amount of work is being done, and the men have been sheepshearing on Wauralte Island. There are

4,600 sheep at this station. The natives are very fond of vocal and instrumental music, and a Point McLeay man (a Poonindite) plays the harmonium in the mission chapel.

It is to be regretted that the Poonindie institution at Port Lincoln was broken up, as the blacks are never happy when removed from the locality of their birth, however inhospitable and barren the place may be, and in a very few years the whole community would have been exterminated.

Three well-dressed and good-looking native women, originally Poonindie girls, but now located at Point McLeay, who had come to the city for the purpose of consulting a dentist, were on Tuesday doing the block in King William street, escorted by a young Australian beau.

Now, will some kind and benevolent dentist open his heart and provide our aforesaid aged and hard-working sister, Louise Karpannie, with a set of ivory grinders?

As the natives have proved themselves to be so intelligent in industrial matters it would be a graceful act on the part of the Agricultural College if two free scholarships (biennial), one for each mission, could be established at Roseworthy, to be held by the most competent native who had passed the compulsory standard of the State schools, as a reward for industry and good behavior on the station, and to fit the holders of the scholarships for the work of a higher and intense cultivation of the soil, and with a view of making the mission stations entirely self-supporting.



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NOTES AND COMMENTS.

The weather during November has been decidedly wintry. Fresh, cold winds, with frequent showers of rain and occasional hailstorms, have been the main characteristics. While the rain has considerably benefited the late crops, the wind has done considerable damage to the ripe wheat, and has greatly retarded hay-making operations. The hailstorms, which have been exceptionally severe, have done very considerable damage to the fruit crop, which is generally light.

The weather during the month has been very unsuitable for haymaking, and although by means of the binder the crop can be cut and stooked in weather quite unsuitable for the use of the mower, it is no use attempting to stack the hay while the sheaves are damp. This some farmers have done in order to finish operations before commencing to reap, but they will probably find that owing to the moisture in the stack fermentation is set up, and the hay becomes burnt, seriously impairing its quality. Many farmers leave their hay too long in the fields, much of the nutritive qualities being lost, but it is equally injurious to cart and stack before it is sufficiently dry.

Those who are wise will benefit from seasons of adversity. Time after time during the past sixty-three years of settlement in this colony there have been periods of drought, and our domesticated animals have died by thousands from starvation and thirst. The number of wise men who make provision during times of plenty against periods of scarcity has slowly increased, and there is now reason for hope that the lesson inculcated by the latest drought will convince the great majority of settlers that such provision is absolutely essential to their existence on the land. Conservation of water by co-operative effort is an item that must be considered at an early date; and storage of fodder—even if it be only straw—by individuals must be undertaken at once.

In order to make the reports of the Agricultural Bureau meetings of more value to our readers, a list of the Bureaus is printed on inside of the cover at the end of this issue, showing location and annual rainfall of each.

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Miss Eleanor A Ormerod, F.E.S., is probably the greatest authority, and certainly the most diligent worker, in Great Britain upon the subject of farm and orchard pests. Her latest production has been a volume of 286 pages entitled "Handbook of Orchard and Bush Fruit Insects," a copy of which that lady has kindly forwarded to the General Secretary of the Agricultural Bureau, where it can be read by anyone interested. The work deals both scientifically and popularly with a great number of insects injurious and beneficial to the horticulturist, including several which are, unfortunately, only too well known to Australian fruitgrowers, and the authoress gives the best known methods of treatment in most cases.

Dry earth is a good disinfectant and deodoriser, as well as an excellent absorbent of liquid refuse. Sand is not nearly so good for this purpose. By using dry soil in pigsties a splendid fertiliser will be secured for use in the vegetable garden. Three or four shovelfuls scattered each day in the sty will be sufficient, but the manure should be removed once a week. Pulverised or calcined gypsum is very cheap, about 25s. per ton on wharf, and a very small quantity sprinkled on putrefying blood, or any other evil-smelling substance, will at once prevent or stop the nuisance, and will "fix" the escaping ammonia, so that the manure will be enhanced in value.

How does it happen that of two men owning equal portions of land side by side, equal in every respect, equal in regard to capital and energy, one man will always be "lucky" and prosperous, whilst the other never seems to "get along"? Very often it may be attributed to apathetic neglect of the robbers and wasters about the farm. The cow which eats an allowance for two and yields half the profit of one good cow, the old hens, the unthrifty breed of pigs, the slow horse, the weedy wheat fields, the neglected fences, and generally the "little leaks" all over the farm work will often ruin a man. The "other fellow" prevents losses in these directions, and proves that it will pay to attend to trifles.

Snails and slugs hide during daylight and dry weather beneath any shelter they can find. Taking advantage of this propensity, gardeners are in the habit of placing boards and other substances elevated just sufficiently above the surface of the soil to allow of the pests crawling beneath. These harbours are examined every morning, and at first very considerable numbers are found, but when they are regularly removed the snails and slugs rapidly decrease, until at last it appears to be scarcely worth the trouble to gather them.

The Chairman of the Agricultural Bureau expects to receive, per *Bremen*, about the first week of December, 70lbs. of the newest and reputed best seven varieties of potatoes raised in Germany, and desires members of the Bureau in suitable localities to offer to take charge of some of them. Address: Mr. F. Krichauff, Stacey Street, Norwood.

POULTRY NOTES.

Written for the "Journal of Agriculture and Industry."

By D. F. LAURIE.

General.—Although in places the recent changes of weather have caused many deaths among unfledged young stock, still the season generally has been a good one so far. At Waikerie Village Association Mr. Edwards has two incubators of my particular pattern, and has had excellent luck with high-class breeding stock. Mr. W. H. Martin, whose record pullet I alluded to in last month's *Journal*, has some excellent Orpingtons and Langshans, also Plymouth Rocks, Indian Game, and Wyandottes. What particularly pleases me is the evident care and up-to-date methods employed by him. Most of the pens and houses are made of slate. Cleanliness is everywhere evident. He has a first-class bonecutter and a handy little mill for grinding different sorts of grain; these are similar to what I saw in Sydney. There seems to be a general and strong steady movement in the right direction. Our producers generally are buying improved stock. I commend the appeal on behalf of the Blind School's farm at the Black Swamp to the generous consideration of all farmers and breeders; personally I will do what I can. Were a fattening establishment started, I believe the plucking and general dressing of poultry would be a very suitable and profitable occupation for many of our afflicted brethren.

Disease.—Unless precautions are taken, as the hot weather approaches, we shall hear of losses through disease. Now, with ordinary care, no disease should exist. In dealing with strange poultry always submit them to at least a week's quarantine, after careful examination for outward signs of disease or vermin. On the expiration of that term, if they do not look bright and well, they must be detained for a further term. Incessant warfare must be waged against vermin of all sorts; use hot limewash, kerosene, shep'dips or phenyle, carbolic acid, Whalley's or Quibell's disinfectants. Poultry roosting in ill-ventilated houses, or confined on ground saturated with their own excrement, will not thrive. Remove the top soil to the depth of 3in. of all small yards and breeding pens, dig over with a fork, or hand-plough it, and apply a dressing of slaked lime. Do not let birds roost in draughty situations. Keep the water cool and well shaded, and feed on sound wholesome food. During the hot weather, once a week, mix a packet of Epsom salts in water, and mix with the soft food for twelve or fifteen fowls. Use no spices or patent foods. As soon as the young stock is well grown, fatten well and send to market. Aim at establishing a good name for eggs and poultry; it pays.

The Indian Runner Duck.

On one or two occasions I have alluded to this coming variety. I alluded to the marvellous laying powers reported as belonging to the breed, and urged fanciers and breeders to import some. This, eventually, the Hon. W. B. Rounsevell did, and had extraordinarily good results the first season. His birds came from Cumberland, and arrived on December 18th, 1896, and started laying in a few days. He bred over 100 during the summer and autumn from a drake and three ducks. Mr. G. H. Dean, who had eggs from Mr. Rounsevell and from Mr. Cadell, of New South Wales, had also a nice lot, has since then purchased the whole of Mr. Cadell's imported breeding stock (included amongst which are birds bred by Simon Hunter, of Northallerton, G. Bishop, J. Donald, of Cumberland, and Cook & Sons, of Orpington House, St. Mary's Cray, all of England). It is an enormous advantage to intending breeders to be able to obtain so many different strains of blood. Mr. Dean speaks in

enthusiastic terms of the breed. Mr. S. Pitman, of Payncham, a well-known poultry breeder, has an excellent flock of Indian Runners. His ducks are of imported strains, and his drakes from Mr. Cadell. Some months ago I published in the *Journal of Agriculture and Industry* the results of the laying of his nine ducks, and I am now pleased to further amplify their very splendid record. The nine ducks were hatched November 16th, 1897. They laid during May, twenty-five; June, 151; July, 206; August, 248; September, 234; October, 249; and to November 19th, 141; making a total of 1,254 eggs, or an average per bird of 139, or equal to about 280 eggs per bird per annum. In addition to distributing sixty sittings of eggs, Mr. Pitman has a flock of over seventy young birds. It shows, therefore, that a great many people have availed themselves of the opportunity of obtaining these great layers. All who have had any practical experience of breeding ducklings for market know that the average duck is a poor layer, and, moreover, many of the eggs laid early in the season are infertile. Now, in addition to the birds being great layers, the eggs of the Indian Runner are, as a rule, all fertile. It is quite possible, especially in the cooler portions of the colony, to breed ducks all the year if eggs can be obtained. Ducks require but little space to grow and fatten in, so that as long as the young ones are well fed and kept cool and shaded, they will grow into good marketable birds. Now, although the Indian Runner, in comparison with Pekins, Rouens, Cayugas, and Aylesburys, is a small bird (the weight for the show pair is limited in England to 4lbs.), still, when compared with the ordinary farm duck, the weight of the Indian is often in its favor, while by carefully weighing bone and offal the test is still more favorable, for the Indian Runner with small offal has very fine bone, and carries meat of excellent flavor. The Runner is a quick maturing bird, and the ducks are very precocious as layers; these are two important points to consider. We have the size and weight in the before-mentioned large breeds; therefore we have only to use the Indian Runner blood to gain these other two points. I have inferred that, as regards crossing with common ducks, the loss will be slight in weight, and as regards crossing with the larger breeds, the crossbreds are of excellent size and quality. Mr. Dean noted that his Indian Runners obtained from Mr. Cadell were larger than usual. Mr. Cadell stated that invariably the progeny of his imported birds were larger than their parents. Indian Runners breed very true to standard; the breed is very prepotent, and stamps itself to such a marked degree that crossbreds often closely resemble the pure bird. The main point about an Indian Runner is his gait—the peculiar run, quite free from waddle from which he gains his name. This run is justly considered the Hall mark in England—taken, of course, with erect carriage, high-held head, long neck, and slim, graceful body. Color should not be washy, but a nice full fawn; the duck having a slight pencilling. The heads of both sexes should be fawn colored, more or less pencilled, with dark markings. I am a firm believer in high-class stock of all descriptions, and will always maintain that with proper attention and suitable food such stock will always outstrip any less excellently bred birds. The drake's beak is more or less a greenish yellow, and the duck's more of a leaden-green color. The wings are white, and when folded give the bird the appearance of having a white saddle. Birds of various colors have been sold in England as the genuine article, but of late there have been some very fine specimens exhibited, notably a pair Mr. Digby, the well-known duck-breeder, won with in 1896 at Birmingham. I advise crossing Indian Runners with Pekins or Aylesburys, and then next year select the finest cross-bred ducks so bred, and mate back either to Pekin or Aylesbury blood. I think any way would be good for producing a good crossbred, *i.e.*, first, back again to Indian Runner, while sacrificing size would give very greatly improved laying powers; secondly, back to Pekin or Aylesbury (using birds of a different strain), whichever variety was used in the first cross, would give size at any rate, and none need be kept as

layers; thirdly, going back to Pekin, when Aylesbury was used in the first cross, or *vice versâ*, we should gain all the merits of a triple combination. Thus, we know the Pekin-Aylesbury is a splendid cross for the table; we also see here that the Indian Runner is an early maturer of excellent quality, and in addition a good layer. In all matters of cross-breeding extra caution is needed; fair results can be obtained by gradually improving the stock each year, by infusing pure blood; still the results of haphazard introductions of new blood can never have the same certain results as obtain when careful matings are made to produce first crosses. There is little doubt in my mind that the Indian Runner will prove a potent factor in the success of the poultry industry in this colony. Old or young they are very hardy; they are excellent foragers, and prefer to live on insects, &c.; they are therefore eminently suited for the fruitgrower. At night they should be housed in a well-ventilated shed bedded on straw; in the morning, as soon as they have laid, they may be released; they generally return at night for an evening meal. Active foragers such as these do no harm in an orchard. Beyond an occasional bath and drinking requirements Indian Runners are not over-partial to water.

I shall be very pleased to hear from any readers as to their season's experiences, and other items of interest; carefully compiled information concerning poultry-keeping in various parts of the colony will prove very valuable. Many people are afraid of publishing their methods; they need not be under any misapprehension, for there are many far more successful and with greater experience who are always ready to drop useful hints for the benefit of others.

All old stock should be disposed of. After the time of laying, say two and a half years, a hen eats more than she pays for, and the cocks lose vigor.

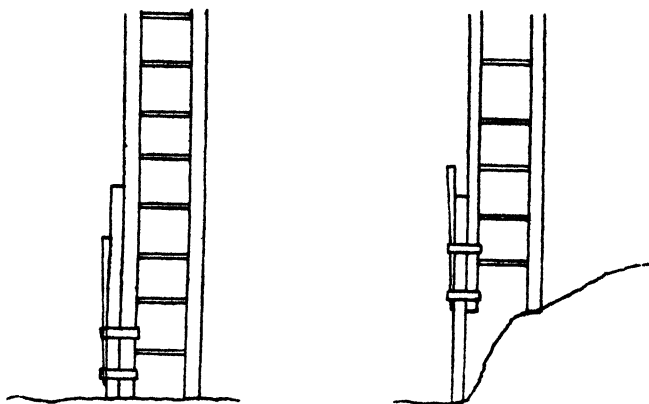
CRUELTY TO ANIMALS.

To the average man cruelty to animals means working them when in an unfit condition, unnecessary beating, flogging, or other direct ill-use, and as such is punishable by law, but very many of our stockowners are guilty of cruelty to their stock, which, though unintentional, and due perhaps to want of thought, is nevertheless felt just as severely by the animals. This is specially true concerning dairy stock near Adelaide. Probably three out of five of the cows from which the milk supply of Adelaide is drawn, after being milked in the morning are turned into open paddocks without shelter of any kind and remain there until the afternoon milking. When the temperature reaches 100° F. in the shade we humans begin to devise all sorts of means to temper the heat, and yet leave our stock exposed to the sun without compunction. It is by no means unusual for the sun temperature to reach 160° F., and the tortures of the poor dumb animals exposed, often without any water, in the bare paddocks, cannot be described. Horse stock receive the same treatment, or rather want of treatment, and in nearly every instance for want of a little thought. These remarks apply equally to country districts, where stock may be seen in mid-summer in stubble paddocks absolutely destitute of shade. In the winter months, although we never experience the rigors of even the neighboring colonies, stock suffer severely at times from absence of shelter. How can the necessary shelter be provided? First, and principally by the planting of clumps of trees, if only a dozen in the corners of the paddocks, or in rows between the paddocks. These require protection and attention for a few years, otherwise they will not thrive. Most of the failures in tree-planting are due to the fact that the trees once planted, perhaps in a small hole the width of the spade, are expected to look after themselves and to fight the weeds for their existence, or trampled and eaten by stock as soon as they commence to grow. Then shelter can also be provided by means of rough sheds of scrub or straw,

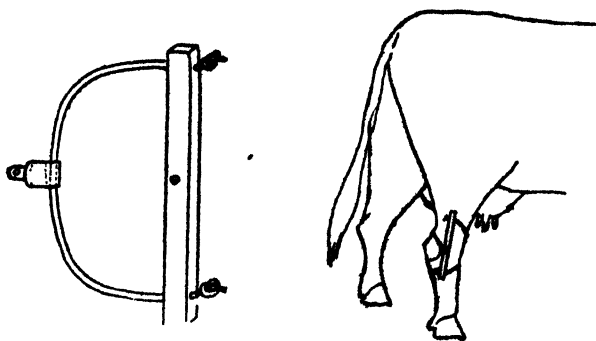
straw stacks, &c., which can be erected at but little expense. Another frequent source of illtreatment of stock is by means of dogs. It is quite the usual thing for many farmers to send their dogs to bring in the cows, which they generally do on the run, jumping and biting at them, with the result that now and again a cow is found minus the greater part of her tail, bites on the legs being too common to be taken notice of. This should be put a stop to. If no one can be spared to bring the cows in the dogs should be taught to do it quietly. Although it is well known that it is distinctly profitable financially to treat dairy cattle in such a manner so that they shall be quiet and contented, and never exposed to hardships, it is remarkable how few of our dairymen pay much attention to these matters.

SOME HELPS FOR THE FARMER.

HANDY FRUIT LADDER.—On hill sides there is often trouble with the fruit ladder on account of inequality of level. Two clamps, a wedge, and a short piece of deal quartering will provide an adjustment, which will commend itself to the approbation of fruitgrowers in the hilly districts:—



FOR A KICKING COW.—To prevent a cow kicking many contrivances have been proposed, but this illustration will show how easy it is to stop the trouble:—



The piece of wood may be round or flat. The loop is made of hide, leather, or cord; is passed around the leg at the place shown, and fixed by the strap to the stud in the middle.

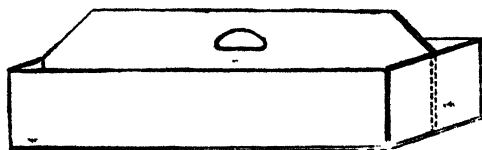
HOUSEHOLD HINTS.

COCKROACHES (otherwise "black beetles") are irresistibly attracted by stale beer, and this can be employed for their wholesale destruction. As they cannot readily climb into a cup, saucer, or ordinary dishes used in the house, a sheet of brown paper or other substance should be laid over the vessel so that the edge reaches the floor. Make a good-sized hole in the centre for the insect to drop through, and bait the cup, saucer, or other vessel with sufficient stale beer to drown the pests. "Beetle traps" are on sale at shops where they sell tinware.

STINGS from bees, wasps, ants, &c., can at once be remedied by rubbing in spirit of ammonia. If this is not available use common smelling salts, wetted with saliva from the mouth. Spirit of ammonia should always be ready where bees are kept, because strangers may visit the apiary, and some people are very seriously affected by the sting of even a single bee. The above is a remedy that can be absolutely relied upon. Onion juice, bi-carbonate of soda, and carbolised oil are palliatives often recommended, but are not infallibly certain ineffect.

MILK should always be subjected to a temperature of 180° F. to 200° F. before being used. If not brought quite up to boiling point, 212° F., it will not acquire the "cooked" taste. When treated in this way for three minutes, there is no danger of the milk causing tuberculosis or "consumption" in the person using it.

It is easy to make a knifebox, but there are many houses in the country where this handy contrivance is absent. Half an hour would give ample time to make one upon the annexed pattern, and if lids were required they could be affixed near the top of the central division by small hinges:—



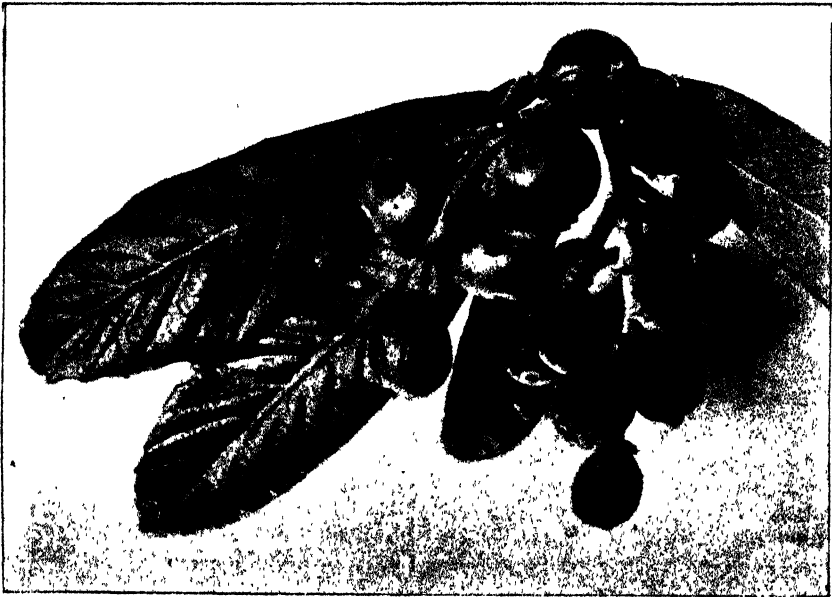
Dogs or other animals poisoned with strychnine can be saved from death by giving in each case about 6ozs. of lard. This is stated upon the authority of Mr. W. D. Turner in the *Virginia Medical Semi-Monthly*. He gave 4grs. of sulphate of strychnine to a dog; waited till its legs were fixed and stiff; had to force the jaws open to pour the lard down his throat; wrapped the dog in cloths to keep up warmth; gave him 18ozs. lard altogether; and in twelve hours the dog was about again. Several other experiments with dogs, fowls, and pigs appear to confirm the statements made. In one case the dose had to be repeated at the end of an hour. In another case the dog was given a second dose of 4grs. sulphate of strychnine. An hour afterwards 6ozs. lard was administered, and one hour later another dose of 6ozs. lard was given, and in thirty-five minutes he was about again.

Dairymen, nurses of children, and many others complain that indiarubber rings, tubes, bulbs, &c., quickly perish in this hot climate; but in most cases they are themselves responsible for the trouble. They should never subject this class of goods to a greater temperature than, say, 100° F. To throw rubber articles into scalding water is very wrong treatment. Wash in tepid water and dry them at once. If necessary to soak the goods, use cold water with a little salt in it. Garden hose should be kept in a cool spot, out of sun-rays, and should never be left with water inside the tube. The best way is to haul it up to the top of a tree so that every drop of water can drain out of it; then coil on a reel and put away in a cool, dark place.

A DISEASE OF THE LOQUAT. (*Fusicladium eriobotryae*.)

BY GEORGE QUINN.

In October, 1893, Messrs. W. F. Gray & Co., of Gawler Place, Adelaide, brought to the office of the Agricultural Bureau leaves of a loquat tree showing spots which had a charred appearance. The leaves were submitted to D. McAlpine, Esq., Vegetable Pathologist to the Agricultural Department in Melbourne, who replied: "The disease of the loquat has not previously been brought under my notice, but I frequently have observed the burnt appearance of the leaves. On submitting the brownish-black portion of the leaf to microscopic examination, I find numerous spores of a fungus. The spores are generally pear-shaped, of a neutral or pale-brown color, and averaging in size $\frac{1}{1000}$ of an inch long and $\frac{1}{800}$ of an inch broad. To define the fungus will require further examination."



In December, 1895, further specimens of fruit and leaves similarly affected were again sent to Mr. McAlpine, who readily defined the disease as *Fusicladium eriobotryae*, or the black spot of the loquat. Mr. McAlpine described the disease as being new to Australia, but well known in Italy upon the leaves of the loquat. He recommended the use of Bordeaux mixture, presumably owing to the successful use of that fungicide against the *fusicladiums* of the apple and pear. He further suggested that all infected portions of the fruit and foliage should be carefully collected and burnt. Although the above statements only show this disease to have been recorded here for five years, I am inclined to think from the condition or rather advanced stage of the infection upon the trees from which the first specimens were obtained, that it has been among our loquat trees for some years prior to these records.

For about four years I have observed its growth upon loquat trees, with a

view to noting its spread and whether it was likely to prove as dangerous to the loquat as their respective fusieladiums have to the apple and pear. It has not spread with any comparative degree of virulence; but in making this statement I do not forget that the seasons during which my observations have been made were in South Australia peculiarly unsuitable for the rapid increase of fungus growths.

At the same time I would advise any grower having diseased loquat trees taking active measures to repress the disease. for, as will be seen by my photograph taken from nature, the disease absolutely destroys the fruits attacked, causing them to become simply a hard, sooty-looking cracked skin drawn over the pips.

The foliage in our illustration is quite healthy, and the large loquat in the centre is of normal healthy development, being tied there for the purpose of showing the difference. Like those of the apple and pear, this fusieladium first appears in small spots, which gradually grow larger, spreading like a grease spot from the centre of infection.

Respecting the use of Bordeaux mixture as a remedy, I may say to those who may doubt its effects upon the tree that in the season just past I sprayed a healthy loquat tree when the fruit was beginning to color with Bordeaux mixture made of 1lb. bluestone, 1lb. lime, in 5galls. of water, and, although the mixture stuck for a long time, no injury was perceptible upon either fruit or foliage. The second recommendation made by Mr. McAlpine is of very great importance, both for checking the spread of the disease and the general development of fruit-carrying wood. This disease has been noted only in a few gardens on the plains, these in dry positions; and in a few in the ranges, chiefly along watercourses. These attacks were mostly severe.

THE VINEYARD.

NOTES AND HINTS FOR DECEMBER.

By ARTHUR J PERKINS, GOVERNMENT VITICULTURIST.

Written for the "Journal of Agriculture and Industry."

There is little to be done in the vineyard in December. Should we be favored with heavy thunderstorms it would be advisable, wherever the growth allows of it, to run the cultivators over the soil and break up the surface crust. With a continuance of dry weather, however, it will be unnecessary, nay, even hurtful to have any further recourse to the teams. The object of summer cultivation is to maintain in the soil as much as possible of the moisture that has been stored there in the winter. This object is obtained by keeping the surface soil loose and free from weeds. By this time all weeds should have disappeared, and should we be favored by no further rains the surface soil will have been left loose by November working. To further cultivate the soil under the circumstances would be not only unnecessary but hurtful, as we render the surface soil no more open or free, but merely expose fresh moist layers of soil to the drying influence of the heated atmosphere, and thus tend to reduce its store of moisture. Exception must of course be made for those localities where summer weeds abound, such as wild melons, &c.; here necessity compels us to call in the horse-hoes to keep them down. If, however, we take solely into account the wild melons, that infest more particularly sandy soils liable to drift, it would be wiser policy to hand-hoe them in preference to disturbing the soil whilst dry, and thus increasing its liability to drift. Some experience of this nature of soil has taught me to prefer weeds to drift, and consequently, weeds or no weeds, I never touch it unless thoroughly wet.

Where necessary, trellised vines may with advantage receive a second dis-budding, more particularly if they are young vines in early stages of formation. The long yearly shoots should be tied up to the wires that are there for the purpose, or else they will be exposed under the influence of the winds to break level with the wires. Grafts, of course, should be visited and disbudded again wherever necessary. The same may be said of layers occupying only a temporary position, to be shifted the following season.

During the past month several of our vineyards have been rather severely visited by heavy hailstorms. In some vineyards, without exaggeration, half the crop has been destroyed; the effects are sufficiently serious to make themselves felt in our final total yield for the season. In some cases, where the fruit has only been partially destroyed, there is little to be done. In some cases, however, leaves and bunches have been completely removed, and the stripped shoots stand bare and naked. In the case of rod-pruned vines, where strong wood is required for the following season's pruning this is a most serious matter. All the buds will start bursting and the shoots become a mass of weak useless laterals, with no good wood for the following year. Under the circumstances a radical remedy is necessary; the shoots should be cut back, as in winter, to spurs of two buds, and instead of numerous laterals we will obtain two strong shoots, forming good serviceable wood for the following year. For rod-pruned vines that have been severely handled by the hail, such a practice is absolutely necessary. No fruit is sacrificed, as it has all been removed, but precautions are taken to secure fruit the following year. With spur-pruned vines this will generally be unnecessary. This practice may even result in the formation of a fair second crop.

DO NOT TOP.

THE ESSENTIAL QUALITIES OF GOOD CIDER.

The report recently issued by the Board of Agriculture upon the Distribution of Grants for Agricultural Education contains an account of some investigations in the manufacture of cider carried out at Butleigh by Mr. F. J. Lloyd, F.I.C., F.C.S., on behalf of the Bath and West of England Society, and the following observations on some of the results have been summarised from Mr. Lloyd's notes.

The essential conditions of good cider in the order of merit or importance are enumerated thus—first, flavor; secondly, good appearance, which includes both color and clearness; and lastly, keeping quality. How to obtain these conditions has been the object of the experiments at Butleigh.

To obtain flavor it is well known that two conditions must be observed. First, the introduction into the juice of any substance which would impart an unpleasant flavor thereto must be prevented. If perfect purity of the juice could be ensured, then it becomes evident that the flavor of the resulting cider would depend either upon the original flavor of the apples or apple-juice, or upon changes which took place during fermentation. The flavor doubtless depends to a certain extent upon the original flavor of the apples, for if cider is made from one variety of apple only, and if this has a special, distinct, and marked taste of its own, such, for example, as the Foxwhelp, this flavor of the apple will be present in the resulting cider. Evidently, then, the flavor of other varieties of apples which may not be so marked must still contribute to the flavor of the resulting cider. These flavoring compounds form an infinitely small part of the original juice, and their true flavor only becomes marked when all the sugar has been converted into alcohol. Even then they are to a certain extent masked by the acid present in the juice, but when both acid and sugar are present they are considerably hidden. On the other hand, a small

percentage of sugar and of acid appears to enhance the good flavor. This is the reason why cider-makers are anxious to leave in the cider a certain amount of sugar. The tannin will also affect the flavor. Now, as the amount of sugar, acid, and tannin vary in every sample of cider, it is evident that uniformity cannot be easily obtained in a bulk of liquid, unless some means exist for blending the juice either before or after fermentation. From experiments on a small scale which have been made at Butleigh in the past, it has been evident that, as a rule, blending the juice improves the quality. In 1897 blending was carried out on a larger scale, and the results have thus far proved to be distinctly favorable. Another factor which plays an important part in the production of flavor in cider is the nature of the fermentation. This has been proved by the experiments on pure yeast. Experiments were started with five varieties of pure yeast. Sample bottles of the cider so made were put aside; and, on the 20th December, 1897, one year after bottling, these were tasted. The results showed that to some extent the flavor varied according to the character of the pure yeast employed. That made with yeast obtained from grapes had a distinctly vinous flavor. That made with yeast originally taken from the Kingston Black apple had a slight flavor of the Kingston Black, but only very slight. That made with the pure cider yeast had more of the flavor of cider, or perhaps it would be better to say, did not bring into the mind the idea of any flavor other than that of cider. But, in spite of these slight differences, there was an undoubted similarity between all these samples, and this was attributed to the flavor of the original applejuice.

As regards the flavor of small cider, it is noteworthy that, in the opinion of a great number of those who tasted the cider made at Butleigh in 1896, the small cider was preferred to the cider produced by the fermentation of the whole juice. After a careful study of all the facts, it seems reasonable to conclude that the flavor of cider very largely depends upon the non-fermentable substances present in the juice; and that if these are in excess they will so cover the flavor due to fermentation as to materially lessen the value of the resulting liquid. If this theory is correct, it is evident that by diminishing the quantity of unfermentable material, one should improve the flavor of the resulting cider.

Why is the cider made from early-gathered apples seldom, if ever, so good as that made subsequently? It was in trying to solve this problem that the influence of the non-fermentable constituents first occurred to Mr. Lloyd.

Experiments were started to test this view. Some apple-juice from wind-falls was fermented as usual in one barrel, while a portion of similar juice was diluted with one-half its own volume of water—by which the non-fermentable constituents would be greatly reduced—and sufficient sugar was then added to make the liquid contain the same amount of sugar as the whole juice. The result was a better cider from the diluted juice than from the whole juice.

These experiments with early-made cider have been more striking in their results than experiments carried out subsequently with what may be termed ordinary juice, though even in the latter case benefit has sometimes resulted. It is not unlikely that the amount of these non-fermentable constituents depends partly upon the season, partly upon the variety of apple, and partly upon the care which is taken in the management of the orchard; but on these points further investigation will be necessary.

It is generally believed that the chief reason why cider has not become a more popular drink has been the difficulty of obtaining it of uniform quality, flavor, and color. The results recorded at Butleigh seem to point to the desirability of obtaining a "standard" composition for the juice, and of blending or diluting the entire juice, until this standard is obtained. Not until this is done will it be possible to produce a liquid which shall have the same uniformity as is now obtained in the wines of the leading manufacturers in foreign countries.

It has been stated that a certain amount of sugar in cider enhances the flavor. Probably the most difficult task of the cider-maker is to retain in the juice this small amount of sugar, or, as it is often called, "sweets." Unfortunately the desire to do so has outweighed all other considerations with some makers; and, as often happen with things which are good in moderation, this desire, carried to excess, has produced a greater evil than the one which it was originally intended to counteract. Those who are investigating the manufacture of cider and other fermented liquids are striving to find a natural means to retain the sugar. Failing the discovery of such a means, preservatives are being used by many, often without the least knowledge of their composition or their effect upon the human body. In view of their wide employment experiments have been made to try and determine what actual benefit may accrue from their use, and what quantities must be employed to be effectual. The results of these experiments will be recorded in due course.

The conditions affecting the color of cider have, it appears, already been investigated in earlier experiments at Butleigh. The color depends partly upon the natural color of the apple-juice, partly upon the freedom of this juice from extraneous substances—as, for example, the juice of rotten apples—and partly on the treatment of the pomace after it leaves the mill and before pressing, for if then exposed to the air it gets darker, and the resulting juice is more highly colored. In the manufacture of cider at Butleigh, precautions are taken to prevent all these sources of high color. Clearness is more difficult to obtain, especially with cider in bottle. It can be obtained in bottle by disgorging, as is done in the wine industry; but the cost of this process would be prohibitive. It is easy to obtain a dry cider in bottle without much deposit, provided the juice is placed in the bottles immediately it comes from the filter, and is not filtered until nearly the whole of the sugar has been fermented. There is a general opinion that sugarcandy will not ferment if placed in the juice at this time, and experiments have been started to determine how far this assumption is correct. That a certain amount of fermentation should proceed in the bottle is necessary to give the cider "life," and the difficulty up the present has been to obtain this "life" without too much deposit. The value of the filter as a first means of obtaining a clear juice has been amply demonstrated at Butleigh.

Lastly, as regards keeping quality, it has been found at Butleigh that if care is taken to obtain the juice free from impurities in the first place; if the fermentation of the juice is carefully watched by means of the saccharometer, and not allowed to proceed too far before filtration takes place; and if subsequently the barrels are kept air-tight, the cider not only keeps well, but improves in quality by keeping. But if the juice is allowed to ferment to dryness before it is filtered, so that no subsequent fermentation takes place to restore life to the cider, it will be far more difficult to keep. All the results up to the present go to show that the juice intended for bottling should be filtered and bottled before the gravity has sunk below 1.020, and that for storing in casks the gravity should not be lower than 1.015.—*Journal of the Board of Agriculture.*

PARIS GREEN FOR CODLIN MOTH.

Mr. L. Woolverton, Grimsby, Ontario, a large apple-grower, who exports over 500 cases to England, and whose total crop averages 1,500 barrels, at a meeting of the Ontario Fruitgrowers' Association, 1896, says:—

"The man who neglects to spray his apple orchard in June with Paris green must expect his crop to be thinned out one-half by the codlin moth in September. Some people even yet need to be convinced of the importance of this, but those who have given it careful trial agree in its benefits. I have tried

spraying for codlin moth for ten successive years, and where carefully done, and repeated if washed by rain, I have found a great saving of my apples and a general improvement in their quality. Few of us growers are exact enough with our experiments to say precisely what proportion of our crop is saved by spraying. A careful experiment was made on one occasion at Geneva Expt. Station, N.Y. Every alternate tree was sprayed twice in June. The result showed 13 per cent. wormy apples on sprayed trees, 35 per cent. on those not sprayed.

"While packing my apples and pears last season I was more than ever convinced of the great benefit of spraying with Paris green. In some portions inaccessible to the wagon this treatment was neglected, and as a result an immense crop of codlin moths was harvested and innumerable apples wasted, while those trees carefully treated were almost free from this mischiefmaker. And that is not the only benefit: indeed, quite as important is the perfection of form of the sprayed fruit. A Duchess apple tree always bore knotty fruit previously, but since being treated to Paris green its fruit has been perfect. [This is probably due to the moistening of the skin by the spray.]

"The codlin moth also attacks the pear, and therefore the pear orchard should also be sprayed in the same way as the apple for its destruction. The Bartlett pear is especially subject to produce knotty specimens, due to the work of the curculio, and other insects. Indeed, fully half the crop has to be thrown out for seconds on this account. But for two seasons now I have sprayed them carefully, and as a result have had comparatively few knotty pears. The editor of *The Country Gentleman*, in a recent number, gives his experience in spraying Bartlett pears, and it corresponds with my own as given above.

"Spray thoroughly, or not at all. I should say that fully half the spraying which I have seen in western New York in the last two or three years is a waste of time and material. Squirting a few quarts of water at a tree as you hurry past it is not spraying. A tree is thoroughly and honestly sprayed when it is wet all over, on all the branches and on both sides of all the leaves. An insect or a fungus is not killed until the poison is placed where the pest is. Bugs do not search for the poison in order that they may accommodate the orchardist by committing suicide. The one spot which is not sprayed may be the very place where a bud-moth is getting his dinner. On the other hand, there are many fruitgrowers who spray with the greatest thoroughness and accuracy, and they are the ones who, in the long run, will get the fruit."

HYDROCYANIC ACID GAS TREATMENT OF CITRUS FRUIT.

It having been frequently asserted in some quarters that the treatment of imported citrus fruits with hydrocyanic acid fumes for the destruction of scale insects was a practice dangerous to the consumer, the following notes from an article by Mr. F. B. Guthrie, Agricultural Chemist to the New South Wales Department of Agriculture, published in the October, 1898, issue of the *Agricultural Gazette* will be read with interest by all those connected with the fruit-growing industry:—

"The following notes on some experiments conducted with the object of ascertaining whether it was possible to destroy scale in oranges, lemons, and apples by exposing the infected fruit to the fumes of hydrocyanic acid without rendering them unfit for market, may be of interest to fruit-exporters.

"A small fumigating chamber was constructed, which could be closed airtight, having a capacity of 16 cubic ft.

"In this chamber a number of oranges badly infested with scale were exposed for three hours to the vapours of hydrocyanic acid, produced from 50 grammes of cyanide of potassium, $\frac{1}{2}$ oz sulphuric acid, and 1oz. water. These proportions are the same as those recommended for adoption in actual practice, but the length of time during which the fruit was treated was longer, so that it constituted a pretty severe test as to the possible injuriousness of the process on the market value of the fruit.

"After three hours the fruit was taken out and allowed to remain in the open air for half an hour. They were then examined for any traces of hydrocyanic acid. There was no trace of any odor or taste of the gas, and on shredding a quantity of the fruit finely and subjecting it to distillation with sulphuric acid no trace of hydrocyanic acid could be detected in the distillate. A special test was made by grating the outer skin of a number of oranges and distilling this separately, as it was thought that if the gas had not penetrated the fruit it would be found in the outer skin or in the scale. No trace of hydrocyanic acid could, however, be detected either in the pulp or in the shredded skin separately. The exposure of half an hour to the air after fumigating would appear to be quite sufficient to enable the whole of the gas to escape. With regard to the effects of this treatment on the scale I forwarded samples of the fruit before and after fumigating to Mr. Froggatt, Government Entomologist. He reports on the original oranges:—'About half the adult red scale was dead and dried up, a quarter was dead, and the other quarter alive. Upon each orange I found live active larvæ under the adult scale.'

"On the fruit after treatment:—'No live scale of any kind. Both the fully-developed females and the larvæ were quite dead.' The fruit was, moreover, in good condition and quite hard.

"Similar experiments were made on samples of apples and lemons infested with scale, with the same result."

ORCHARD NOTES FOR DECEMBER.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

Fruitgrowers in this colony are experiencing a somewhat anxious time this season owing to the peculiar weather conditions that have prevailed, and the singular patchy and irregular nature of the crops of various kinds of fruit.

Cherries have been wonderfully scarce, and as I write, 1sts. to 20s. is being offered per bushel case for fair samples. The lucky owners of moderate crops are in great request, but the hail and rain has caused much fine fruit to split and become greatly reduced in value.

Some enterprising packers are packing these fruits in 2lb. punnets with a partition, and placing a dozen punnets in suitably ventilated cases. These are for export to West Australia, and carry well under ordinary conditions. This is indeed a step in the right direction, being a leaf clipped from the book of Californian experience.

If not too much injured by hail the recent rains should benefit the second crop of strawberries, which in some localities promised to be heavy.

Our more intelligent strawberry growers are awaking to the fact that cross fertilisation of the flowers is very necessary, and are planting the pistillate and bisexual blooming varieties in close proximity so that the cross pollination may be readily completed by insect or other agencies. This is another triumph of the science of botany as applied to commercial fruit production. In many places the crops of plums, peaches, and apricots promise to be abundant, and as the time of thinning to obtain the best results is now passed, the best plan to

follow will be found to nourish the trees with moisture and manure to enable them to carry their burdens through to maturity. Where water and manure is available peaches may be greatly improved by a saucer-like opening being made around each tree, into which a couple of wheelbarrowfuls of fresh stable or cow manure is placed, the basin is then filled with water, and the effect is like a good application of liquid manure. Manurial qualities are washed into the soil with each watering, and the litter keeps the ground cool and moist above the root system. The hailstorms during October and the early part of November damaged much fruit on the weather beaten side. The strong winds which accompanied the hail held the branches up or apart, and this allowed the hailstones to do much more damage than they would have done in ordinary calm weather. The short-stemmed densely-foliated trees during such weather show to advantage in resisting storms and emerging from them without the loss of either limbs or fruits.

I am informed that the raspberry crop is practically a failure, and am afraid as the timber is cleared more extensively from the gullies and slopes of our ranges the raspberry will recede, until it becomes a luxury rather than a staple preserve for every home. I have not seen any grower testing the Logan berry, the raspberry-blackberry cross of California. This plant thrives on the plains, and produces palatable fruit of a good size, and I am of the opinion more will be heard of it when some of our enterprising growers in the hills take the plant in hand to test it in earnest.

In those districts within easy reach of good city markets, there will be scant need for growers to resort to drying or pulping apricots or peaches this season, for although the crops may prove above the average in quantity, there will no doubt be a good demand by the factories as well as for table use. The apple crop is not large, consequently growers will do well to try to save all they possibly can from the ravages of codlin moth by carefully examining the bandage traps every week, and gathering promptly all fallen infested fruits. The cheapest way to destroy the larvæ within the fruits so that they may be fed to stock is to submerge them for a couple of days in water. This is most readily done by tying them up in sacks. Spraying with Paris green or arsenite of soda in limewater should be continued at fortnightly intervals where practicable at all.

The citrus trees are showing signs of an excellent crop, and the cool weather prevailing of late has assisted the newly-set fruits to obtain a firm hold. Irrigation should be applied to these trees when necessary. It is not wise to wait until the trees show signs of distress, but rather test the moisture in the ground occasionally by opening a hole with the spade.

The cultivation of the surface of the orchard is of importance now if a hard surface is to be avoided after the recent heavy showers.

The disbudding of superfluous shoots on young trees now being formed may still continue.

Budding different fruit trees is practicable during this month, but excepting in localities where it is impossible to apply water to the worked trees this operation is best left till later in the summer, as dormant buds are generally to be preferred in starting the young tree next spring to those trees which have made weakly shoots owing to having been budded early. This applies more forcibly to stone fruits than those of the citrus family.

When water is available, and the distance between the nursery bed and their permanent growing positions is not great, citrus trees may be safely transplanted if ordinary care and skill are exercised.

The suppression of all suckers should be insisted upon. When removing these cut as closely to the root as possible so as to check a repetition of the evil.

The extreme heat of last summer has apparently checked the increase of red scale upon the citrus trees to a large degree, but owners of heretofore-infested trees should dress them as usual and try to suppress this pest while nature assists, and not leave off precautionary measures because the pest is lessened, for rest assured the few remaining alive will in the course of a season or two become as numerous as formerly.

The resin wash, made by dissolving 10lbs. resin, 10lbs. soda crystals, and 5lbs. soft soap in 50galls. of water, is the most successful wash I know for suppressing this pest, but the tent treatment of fumigation with hydrocyanic acid gas, though costly, is no doubt the most efficacious in the end.

Complaints of the "Rutherglen fly pest" come from some parts, but it is a well-known fact that this bug does not exist and breed in the first instance, excepting in ground growth and weeds, so that its presence in an orchard is usually an indication of past neglect of cultivation and cleanliness.

NOTES ON VEGETABLE-GROWING FOR DECEMBER.

By GEORGE QUINN.

The frequent storms of wind and hail, accompanied by great variations in the temperature, have been extremely injurious to crops of summer vegetables, many tales of disaster to crops of beans and melons of all kinds coming to hand. There can be little doubt that the plants which do survive these storms will grow very vigorously when the weather becomes settled, as the moisture in the soil will create a humid atmosphere, so suitable to most summer crops. The best way to repair damages is to make fresh sowings immediately of all kinds of vegetables that have any chance of maturing in time to be profitable. The sowings of dwarf and runner beans will still be made.

These plants are gross feeders, requiring plenty of manure of a rich character. Stable manure should be thoroughly decomposed, and bonedust should not be placed in too close proximity to the seeds when sown. Superphosphates may be drilled in with the seeds. Before sowing the ground should be watered, and when dry enough to be workable the drills prepared. I like to soak the beans before planting, as they germinate much more rapidly, and thus avoid the hardening of the soil. The best method to soak them is to pour hot water, in which the fingers cannot remain more than an instant (not boiling), over the seeds. Allow them to soak for a couple of hours, and then pour off the water half an hour before handling the seeds. This latter precaution allows the skins to toughen slightly, and the seed-cotyledons will not break asunder in the sowing. The seeds should be covered with about 1in. of finely-pulverised manure. This ensures a more even germination or growth, and avoids the usual common loss through the stemlet being bent and broken in ascending through the surface. The surface of the ground between the drills should either be covered with manure, or broken with the hoe after each watering.

Tomatoes and capsicums may yet be transplanted with hopes of success. If green or brown grubs attack the tomatoes at night, make a mash of $\frac{1}{2}$ lb. Paris green, 4lbs. treacle, 30lbs. bran, with enough water to make a stiff paste. Place a teaspoonful near each stem of a tomato plant.

Keep the tomato plants tied up securely, more particularly the central stems. The side laterals may be pinched in from time to time. Melons that are running freely may be pinched to induce branching.

Keep all bean pods picked from the plants as soon as the beans inside begin to show through the sides of the pods. The effect of allowing a couple of legumes to ripen seeds is disastrous to any bean plant.

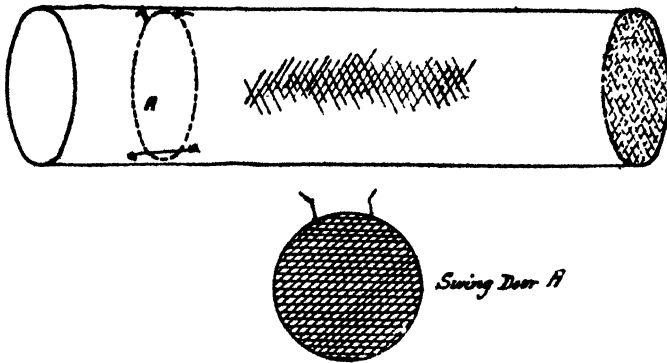
Keep flower stems cut away from silver beet, rhubarb, parsley, &c., and apply a mulch of manure to the surface, supplying water in good soakings as required.

The growth of asparagus plants should be encouraged as far as possible by liberal applications of manure and water.

Sow seeds of salad plants in cool shaded positions, mulching the surface carefully with broken manure. By these precautions, even on the plains, lettuces, radishes, and cresses may be grown in the summer. In the hills, where abundance of water is assured, sowings may be made of nearly all kinds of vegetables.

A NOVEL AND CHEAP RABBIT TRAP.

Mr. J. Sears, a member of Foster Branch of the Agricultural Bureau, sends a model of a cylindrical rabbit trap, of which the following is an illustration:—



The trap is made of ordinary rabbit-proof wire netting. It is 3ft. long, about 7½ in. diameter (or 1ft. 9in. circumference), and the trap-door is placed 9in. from the mouth or entrance. This is simply a ring of common fencing wire crossed with wire and slung with wire loops, and a piece of wire is stretched between it and the entrance, so that the rabbits can pass through readily but cannot get the trap-door back towards the mouth. It must be rather less in diameter than the inside of the cylinder.

To use these traps provide, say, twenty for each large burrow, place one in the entrance of each hole, and fill up around the mouth of the trap by aid of a spade. It is important to make the hole fit the entrance to the trap else the rabbits will escape through the gap. Fill up any apertures where traps are not set. Do not remove the traps for three or four days, and if any fresh holes are opened place another trap there.

Mr. Sears states that it is usual to take two or three rabbits from each trap, and he has taken five from a single trap. He suggests that it would be possible to send rabbits alive to Adelaide and thus ensure that they arrive in a fresh and sweet condition, which cannot always be the case where the animals are taken with steel traps and are killed before being sent to the freezing works or to market.

FARM NOTES.

By W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,
ROSEWORTHY, SOUTH AUSTRALIA.

Written for the "Journal of Agriculture and Industry."

Harvest is early this year. We hope to have all our hay in the stack and all our crops in the stook before the end of November. Harvest operations, however, have been retarded considerably lately by the broken weather which has been prevailing. The boisterous winds must have shaken out much grain, and attention has been rudely called to the varieties of wheat most likely to shell out. Stripping has been delayed by the cool showery weather, and hay carting has been more intermittent than usual. It is satisfactory to find that in the Lower North, at any rate, the yields are likely to be higher than the dry spring led us to anticipate. Indeed, I am satisfied that we will reap twice the yield we would have had had we received the rain in September we longed for and that followed by weather such as we had in the end of August. In the beginning of September rust could be seen, by anyone who looked carefully for it, in abundance in most wheat fields, but the dry weather prevented its spread. I have not previously noted its appearance so general so early in the year, and I know many farmers watched it with much anxiety, and congratulate themselves now that the dry weather, so much deplored at the time, saved them from something much more serious—the devastations of rust. "There is some soul of good in all things evil" they now recognise.

On the College farm we are cutting all the crops with the binder, and will not take the stripper from the buildings. We are not adopting the binder and thresher instead of the stripper in the belief that it is the more profitable practice on farms generally. We do not expect to recover more wheat than if we used the stripper, but as we save all the straw and have been able hitherto to use or sell all we grow, we find it more profitable under our conditions. Stripping and winnowing the grain in the field is likely to continue the mode of harvesting here. It is much more expeditious and cheaper, and it can be carried out with fewer hands; but, of course, the crop is exposed to greater risk in that it must stand some days longer, with more risk of fire and more chance of being shaken out by rough weather. It would be interesting to know to what extent the quality of our wheat from the miller's point of view suffers by our using the stripper so extensively. We know that grain harvested in good time—that is a few days earlier than it can be stripped and, as things work out, on the average a week or ten days earlier than it is stripped—has a brighter color and yields, weight for weight, more flour; but definite tests and researches under our conditions have not, so far as I know, been carried out in the colony. I expect we will be able to follow up the matter here shortly. Of this I am assured, however, that we dare not in this climate cut our wheats so green as can be done in moister, cooler climates; that we cannot, without loss of grain, hope to stack our wheat and thresh at our leisure in January, February, and March, or later, for on warm days the handling of the sheaves such as stacking necessitates threshes out much wheat; and that if we thresh at all it will have to be done mostly straight from the field. I have stacked grain to be threshed later here, but in forking the sheaves the wheat fell around like a hailstorm. Threshing from the field creates a great crush of work, and many more hands must be employed. It is killing work also in average December weather—much more serious than stripping and winnowing. Students here always about this time of the year inquire eagerly whether we will strip or thresh our crops this season. I know the meaning of their anxiety well, for

threshing is the heaviest, most suffocating work of the year. Nevertheless, we will thresh again, for, being able to sell the straw, we are able to obtain as much for it as would pay for the binding, twine, stooking, carting, and threshing of the crop. If, however, every farmer offered his straw in the market things would be otherwise, and it would not be worth carting.

Hay should be secured as early as it possibly can be done. The employment of abundance of labor at harvest time is well-spent money. One cannot too much hasten things after the hay is ready, and similarly with grain. Twenty pounds will pay for several hands, and much more than £20 value may be lost by trying to get along without it, and incurring depreciation of hay through bleaching and weather, or loss of wheat through winds or rain. Farmers, I think, would be well advised to save as much straw as possible this year. An extra hand working the binder or self-delivery mower in the opposite direction to the stripper and immediately behind the stripper is usefully employed. The straw can be stacked to be pressed later, or pressed and stacked right away, or even simply stacked, and it will be found useful, no doubt, at some later time.

Where crops are foul with poppy and other weeds, burning the stubble has much to recommend it. The fire does the land some little good, and it effectively finishes seeds of weeds.

There is one implement which somehow has been overlooked in our evolution of implements—the winnower. Grinding away under the broiling sun turning the handle of a winnower should surely be considered now-a-days archaic. A bigger machine, capable of elevating the chaff and grain from the stripper; cleaning, grading, and bagging the wheat; easily adjustable, according to the wind; readily moved to the corner of the crop as the stripping proceeds; and all worked and moved by horse power, is surely practicable. A prize was offered for a stone-gathering machine some years ago without much success. This invention would be much more worthy of a prize, and I think such might fairly be offered to encourage work at the matter.

MANURES FOR ROOT CROPS.

At the Momohaki Experimental Station, N.Z., last year experiments with various fertilisers for root crops were carried out. The season being unfavorable the returns were not as satisfactory as was expected. The following is a summary of the results:—

Potatoes.—Four varieties of potatoes were used in this trial. Three cwt. of each manure tried was applied, the results being:—Steamed bonedust, averaged 8 tons 13cwt. per acre; super., 8 tons 12cwt.; special potato manure, 8 tons 2cwt.; no manure, 6 tons 7½cwt. Steamed bonedust, costing £1 1s., gave an increased yield of 2 tons 5½cwt.; super., costing 15s. 6d., 2 tons 4½cwt.; potato manure, costing £1 1s., 1 ton 14½cwt. The relative cost per cwt. of increase works out at 5½d., 4½d., 7½d. respectively, so that the super. gave the most profitable return.

Mangolds.—With long red mangolds a number of fertilisers were tested, the best results being obtained from application of 392lbs. of super. per acre, at cost of 18s., the yield being 52 tons 7½cwt., nearly three times as much as the plot not manured. Next came the plot treated with 392lbs. green bonedust and 112lbs. sulphate of ammonia per acre, which yielded about 4 tons less than super., but cost £1 6d. more for the fertiliser. Steamed bonedust and super., 196lbs. of each, was third with return of 44 tons 11cwt., cost £1 1s. 2d.; 392lbs. of steamed bonedust, costing £1 4s. 6d., was a little more than 5cwt. short of this; while green bonedust, costing £1 4s. 6d., only yielded 36 tons 17cwt. It was estimated that the mangolds were worth 2s. 6d. per ton, while

the manures cost the following amounts to produce a ton of mangolds:—Super., 6½d.; bonedust and ammonia, 15d.; bonedust and super., 9½d.; steamed bonedust, 11d.; green bonedust, 15½d.

Turnips.—Champion Swedes were used in this trial. A number of manures were tried, in most cases in two quantities, viz., 2cwts. and 3cwts. per acre, the plots being half an acre each in area. The smaller quantity of fertiliser gave the more profitable return in each case. Where no manure was applied only 2 tons 14cwts. per acre was obtained; with 2cwts. special root manure, 26 tons 1½cwt. was the crop; 3cwts. of same manure gave 31 tons 9½cwts.; 2cwts. steamed bonedust gave 31 tons 4cwts.; 3cwts., 31 tons 7½cwts.; 2cwts. green bonedust gave 29 tons 4½cwts.; 3cwts., 31 tons 1cwt.; 2cwts. of super. yielded 19 tons 9cwts.; 2½cwts., 21 tons 4½cwts. The manures, excepting super., cost 7s. per cwt.; super. cost 5s. 2d. The cost of producing an extra ton of roots was approximately as follows:—Root manure, 2cwts. per acre, 7½d.; 3cwts., 8½d. Steamed bonedust, 2cwts. per acre, 6d.; 3cwts., 8½d. Green bonedust, 2cwts. per acre, 6½d.; 3cwts., 8½d. Super., 2cwts. per acre, 7½d.; 2½cwts., 8½d. It will be seen that the manure returning the most profit per ton of roots was steamed bonedust, at the rate of 2cwts. per acre, green bonedust being very close up. Comparing the returns from the larger quantities, super., although giving the smallest return, cost the least per ton to produce same.

WATER SUPPLY FOR CROPS.

In the annual report of the Ontario Department of Agriculture, Mr. J. B. Reynolds, B.A., Lecturer in Agricultural Physics, in an interesting paper on "How to Assure a Water Supply for Crops," records some interesting experiments on the manner in which water is absorbed into and evaporated from the soil, and sums up the practical issues as follows:—1. Cultivate the land thoroughly and judiciously to assure a fine texture. Work for a firm, close subsoil, since that condition, within reasonable limits, is the most favorable for holding water and for conveying it to the plant roots. 2. While a firm subsoil is desirable, a loose mulch is equally desirable to prevent the loss of water by evaporation. Practice frequent shallow cultivation for all crops that admit it, and be cautious in using the roller, since its use encourages evaporation. 3. Destroy all weeds, as they waste both the soil fertility and the soil water. 4. Keep up a plentiful supply of humus.

He shows that the greater the amount of humus, *i.e.*, decayed vegetable matter, in the soil, the greater the water content and the less the danger from drought. Also that the finer the soil the more water it will hold, and the more readily will it supply water to the roots from the storehouse of water underneath.

"Conservation of Soil Moisture" is the subject of a very suggestive and instructive bulletin (121) from the University of California Agricultural Experiment Station, contributed by Professors E. W. Hilgard and R. H. Loughbridge. They remark that "from numerous observations, made both in Europe and in the eastern United States, it has been found that from 300 tons to over 500 tons of water are on the average required to produce one ton of dry vegetable matter." That will give some idea of what amount of water must be available during the growth of any crop, not only for the growth of the plants but also for natural evaporation. To produce a crop of green maize equal to 32 tons such as was once produced at Enfield, near Adelaide, at least an equivalent to 24in. of rain was required to be stored in the soil within reach of the roots—say 4ft. depth—or to have been made up by storage in the soil and rainfall combined. But nothing like this amount of moisture was either supplied by rainfall or stored in the soil. How, then, did the crop

acquire its moisture? The land was deeply ploughed and thoroughly prepared; it was heavily fertilised with farmyard manure; and the surface was frequently shallow-cultivated during the growth of the crop. The soil was deep sandy loam, and the loosened surface probably threw off much of the heat during the daytime, and allowed the moist warm air to find its way down into the cool soil, where the moisture of that air may have been condensed by contact with the colder soil. This effect was possibly still greater during the night time. Then the "natural mulch" afforded by the loosened surface undoubtedly prevented abstraction of moisture from the lower strata of soil, so that there was nothing like the waste of moisture that would have occurred had the soil been shallow and caked on the surface. By having the soil pulverised and permeable to a good depth the moisture would naturally sink, and some of the roots would follow the moisture. Whilst it cannot be too strongly impressed upon our minds that the soil should be thoroughly well prepared in time to catch and store the early winter and spring rains, so that they may sink and be stored in the sub-strata, it is even more important to understand that this stored moisture cannot be "sealed down" by means of a caked or indurated surface. As it is impossible to put on a mulch 2in. or 4in. deep of decayed vegetable matter, we must adopt the cheaper and more rational mode of making a mulch of the natural surface soil. By keeping this regularly pulverised to a depth of 2in. or 3in. the capillarity of the surface is broken, and by this means only can the subsoil moisture be "sealed down." A somewhat compact subsoil—not indurated or dense—will store and hold water in suspension for a very long time, but the surface "mulch" must cover it, or it will very soon become "as dry as a brick."

DAIRY CATTLE.

BY G. S. THOMSON, DAIRY INSTRUCTOR.

The subject of breeds of dairy cattle is of vital importance to the industry of dairying in our colony. Many erroneous ideas exist relative to breeds and crosses of dairy stock, their qualifications being somewhat conflicting amongst the dairy community. At present our dairy cows are rather inferior, principally due to the result of careless crossing and gross neglect of care required concerning bulls. In general, worthless animals are permitted to roam amongst herds of cows, young and old, with a certain consequence that the progeny are less perfect than themselves, and only reduce the quantity and quality of the milk of the herd to which they belong, and endanger any good point as a breeder or a milker that a cow may possess. This is not the only serious result, but the period of milking is interfered with. There is no regularity, neither relationship with prevalence of feed nor price of produce. Where careful attention to crossing and feeding is paid, many cows will be in full milk when the price of produce is at its maximum, at the same time a good flow of milk will be kept up throughout the season, thus bringing in a profitable return to the farmer. The thoughtful breeder aims at the strengthening of his herd; inferior calves he never rears; worthless and unshapely cows he never buys; the milking and fattening attainments of his stock he is thoroughly acquainted with; and above all, the pedigree of his bull is foremost in his knowledge. The careless breeder aims at no standard, he forgets that a worthless cow sometimes eats more food than a valuable one. Any sort of animal possessed with four teats will meet his purpose, and any bull will be in every way suitable if he is at all fertile. Success to the dairy farmer cannot possibly follow when inattention to breeding, feeding, and rearing of stock remains as a secondary consideration on the farm.

It is highly important to consider suitability of the district for breeding, as one district will be found suitable and profitable for the raising of heavy milking stock, whilst another of a poorer and more exposed nature could only carry a lighter class and more limited in number.

Points to be Regarded by the Breeder and Raiser of Dairy Cattle.

1. A knowledge of the pedigree of the bull, *i.e.*, the qualities of his ancestors.

2. The attainments of the cows to be crossed with, whether for milk or flesh in the young stock. If for milk, the register of milking will attest her suitability.

3. Feeding and rearing of the calves in order to build up a strong constitution.

4. Considerate feeding of the matured stock to maintain body and milk.

5. Period of crossing, with attention to season, feed, and price of produce.

Treating the chief dairy breeds of cattle, we have the Jersey, Guernsey, Ayrshire, Shorthorn, and Holstein; also, but of less importance, the Redpoll, Devon, and Kerry. Not having sufficient information as to the capabilities of the fine Holstein herd, it will be advisable not to class them.

The following table will give the distinctive colors, the average live weight, and quantity and quality of milk of the four first breeds, along with the Kerry:—

	Color.	Weight. lbs.	Quantity of Milk, galls. per year.	Quality of Milk.
Dairy Shorthorn..	roan	1,350	600	3·7
Ayrshire	red and white	1,000	550	3·8
Jersey	golden fawn	830	450	4·4
Guernsey	orange and white	1,000	520	4·2
Kerry	black	700	420	3·8

Shorthorns.—The Shorthorns are divided into two classes, the Booth and the Bates.

The Booths represent the fattening tribe, being more fleshy, thicker, shorter legged, but less stylish and more patchy. The Bates represent the milking tribe; they are more upstanding, gay, and handsome, with clean-cut head and fine carriage, but narrower, thinner in flesh, and less suitable for the butcher. The early history of the Shorthorn is not very closely understood; it is supposed that they derive their origin from a cross with bulls imported from Holland into Yorkshire in the East and North Ridings, of which county the Holderness and Teasewater breeds have been long established and deservedly esteemed.

The distinctive points of the Shorthorn are as follows:—The color of the skin should be creamy-yellow all over, without any black points either in the mouth, nose, ears, eyelids, or horns, the hair should be red, white, or roan, but not brindle or black, the horns should be wide set, not turned up at the points, curving, and rather flattish.

The good qualities of the Shorthorn are their rapid growth, quick fattening, early maturity, and large size. The dairy strain are splendid milkers, quiet and good-tempered, fairly hardy, and adapt themselves to a considerable variety of food and climate. They possess, in greater degree than any other single breed, a combination of highest qualities to milking and fattening breeds. Their great value depends chiefly on the remarkable certainty with which the bulls impress their good qualities on their progeny out of inferior breeds with which they have been crossed; their crosses with coarse animals are more symmetrical, with small cattle are larger, with slow feeders are quicker, when at the same time the progeny retain any good qualities they may derive from their dams. The milking Shorthorn is specially suited for warm and dry districts with good

feeding. They are much less suitable, as a distinct breed, than the Ayrshire for bare hilly and poor districts owing to their greater size and more tender constitution.

In the purchase of a Shorthorn bull for dairy purposes one must be confident that the animal belongs to the dairy strain and not the fattening, as is generally the case. Many a good Shorthorn bull has been condemned owing to the low milking standard of his stock, but in all probability the mistake lay with the purchaser in choosing a bull from the wrong strain.

Ayrshire.—The Ayrshire is universally allowed to be in its form the true type of a dairy cow. The special characteristic point in the breed is the wedge-shaped body, *i.e.*, the narrowness in front and its gradual widening and deepening backwards. This peculiarity is visible either from front, above, or broadside. Among dairy breeds the Ayrshire carries the pre-eminence as a general purpose dairy cow, possessing a combination of good qualities which suit for general usefulness. She is hardy, capable of milking well from pasture on poor land, and yielding from second rate pasture and inferior food perhaps a larger quantity of milk in proportion to her size than any other breed. The milk is of good quality and is specially suitable for cheese-making, as the butter particles are small and mix better with the curd to make a rich and uniform cheese.

It will be of interest to relate the points of the breed, so that the reader may readily observe the features of importance, and compare with the scale in judging the Guernsey, and in the selection of dairy stock.

1. Head short, forehead wide, nose fine between the muzzle and eyes, muzzle large, eyes full and lively, horns wide set on, small, and inclining upwards.

2. Neck moderately long and straight from the head to the top of the shoulder, free from loose skin on the underside, fine at its junction with the head, and enlarging symmetrically towards the shoulder.

3. Forequarters—Shoulders sloping, withers fine, chest sufficiently broad and deep to ensure constitution, brisket and whole forequarters light, the cow gradually increasing in depth and width backward.

4. Back should be short and straight, and the spine well defined, especially at the shoulders, ribs short and arched, body deep at the flanks.

5. The hindquarters long, broad, and straight, hook bones wide apart, and not overlaid with fat, thighs deep and broad, tail long, slender, and set on level with the back.

6. Udder capacious and not fleshy, hind part broad and rounded like the side of a cheese, the whole firmly attached to the body, the sole nearly level and extending well forward, milk veins well developed; teats from 3in. to 3½in. long, and hanging perpendicularly, distant apart at the sides equal to one-third of the length of the vessel, and across to about one-half of the breadth.

7. The legs short in proportion to size, bones fine, and the joints firm.

8. The skin soft and elastic and covered with soft close woolly hair.

9. The color red of any shade, brown or white, or a mixture of these, each color being distinctly defined; brindle or black and white is not in favor.

Shorthorn-Ayrshire Cross.—The cross from an Ayrshire cow and Dairy Shorthorn bull produces a valuable milker with a good fattening quality. Their splendid milking records are to be found in all countries. As an illustration the following may be taken:—Upon a farm of 20 acres in Victoria eight Dairy Shorthorn-Ayrshire crosses gave last year an average of 788½galls. of milk, with a butter fat test of 3·7, making on an average 338lbs. of butter. Care in selection and feeding brought the standard of this herd to its valuable and profitable position. It is recognised that no better cross for combined dairy and fattening purposes is known to the dairy world.

Guernsey.—A number of years back all Channel Islands cattle bore the name of Alderney, an island that supplies a very small number of these cattle,

and whose breed now, by the use of Guernsey bulls, have become larger and coarser than the fine deerlike Jersey. In late years the difference between the Guernsey and Jersey has become more marked, both in size and color, and particularly the head, horns, and nose. The Guernseys are larger, rougher, and less elegant than the Jerseys, and are generally of a yellow-brown color, patched with white on legs, belly, tail, rump, shoulder, and head. They are sometimes spoken of as "orange and lemon" cattle. In weight the Guernsey is by no ways mean. She is of the desired wedge form, high and broad in the hindquarters: narrowing towards the front, yet she is not thin in the chest like many milk cows, but has a thickness through the heart which indicates constitution; her skin is of a rich yellow, and the color of her milk and butter is even higher than that of the Jersey. In size she is nearly a third larger and more robust.

The following scale will serve to indicate the main characteristics of the Guernsey, and the award of points is worthy of attention:—

1. Head fine and long, muzzle expanded, eyes large, quiet and gentle expression	4
2. Horns yellow at base, curved, not coarse	3
3. Nose free from black markings	1
4. Throat clean, neck thin and rather long and heavy at shoulders	7
5. Back level to setting on of tail, broad and level across loins and hip, rump long	10
6. Withers thin, thighs long and thin	4
7. Barrel long, well hooped, and deep at flank	10
8. Tail fine, reaching hocks, good switch	1
9. Legs short, arms full, fine below knee and hocks	2
10. Hide mellow and flexible to the touch, well and closely covered with fine hair, yellow inside the ears, at the end of tail, and on skin generally	12
11. Fore udder large and extending forward and not fleshy, udder full in form and well up behind, with flat sole, teats rather large, wide apart, and squarely placed	25
12. Milk veins prominent, long, and tortuous	6
13. Escutcheon wide on thighs, high and broad, with thigh ovals	5
14. Size, general appearance, and apparent constitution	10

Jersey.—The Jerseys are a beautiful breed of cattle, are slender and graceful in form, and possess a strikingly refined deerlike appearance, fine small head and distinct muzzle, expressive eyes, slender tail, thin deep yellow skin, and very clean in the bone. The horns are short, smooth, crumpled, and tapering, with black tips. Color of skin is said to indicate richness of milk. Compared with the Guernsey, the most noticeable features are smallness of stature, more thoroughbred-looking appearance, horns thinner, face finer and more docile and intelligent in look, the eye is bright, black, often with a white rim, tongue black, and the muzzle intensely black with a light-colored rim round it. This is one of the most striking differences between the Jersey and Guernsey, and a distinctive feature of the former. The qualities of the Jersey as a butter-making cow has no rival, although closely followed by the Guernsey. As will be observed in the foregoing table, her quantity of milk is not high, but is very rich in butter-fat, which occurs in large globules, and makes butter of a rich golden color. The butter is easily worked, is firm, and very wax-like in appearance and possesses unusual richness and flavor. Many Jerseys give four hundred pounds of butter in the season, but they have little or no value except for milking. As a rule the cows are gentle and docile in disposition, but are somewhat delicate in constitution, thus becoming unsuitable for ungenial and barren districts. A cross with the Ayrshire gives progeny of a more robust nature, able to survive on scantier feeding and withstand less favorable conditions. With the Dairy Shorthorn heavier stock is obtained, and the

milking capacities of both classes are of a high order. It is worthy of note that in the milk of the Jersey for a time after calving a very strong flavor is noticeable, and during the period when weeds are prevalent the milk appears to hold the taint in a somewhat fixed condition.

Kerry.—The Kerry is the only pure native Irish breed of cattle. There are two varieties, the true Kerry and Dexter Kerry. The true Kerry is a neat, active, and very symmetrical little animal, with a fine compact head and white cocked horns tipped with black. Black is the fashionable color, but there are black and whites and also reds. The Dexter is the result of a cross introduced over eighty years ago by a Mr. Dexter, and is a heavier, coarser, and thicker boned and less symmetrical animal, with horns inclined to be longer and straighter. The true Kerry is very hardy, fattens readily, and yields a fine quality of beef. Cows give very rich milk and a large quantity for their size.

From what has been said we may regard the Ayrshire as the most suitable breed for general dairy purposes, followed by the Dairy Shorthorn. For cheese-making the same order. Butter-making, (a) Jersey, (b) Guernsey, (c) Jersey-Ayrshire cross, (d) Shorthorn-Ayrshire cross. Town dairying, *i.e.*, milk selling, (a) Shorthorn, (b) Shorthorn-Ayrshire cross. Cottagers, (a) Kerry, (b) Ayrshire. Private gentlemen, (a) Jersey, (b) Dairy Shorthorn.

Selecting Dairy Stock.

Particularly in a dairy herd the milking propensity is quite as transmissible through the male as through the female line, and it is argued that the milking aptitude is preferably propagated through the male, in view of the large number of offspring of one bull as compared with those of one cow. Whatever the breed the first stage of improvement must begin with the male, and to this end it is essential that pure-bred sires be used. It is customary to find where a well-bred bull has been used for a few years the standard of a once inferior herd is made valuable, and it has been recorded on several occasions that when a bull calf is saved from a favorite cow and used in the herd the good strain reverts back to the original inferior state. No more interesting and profitable branch deserves the attention of the farmer than the building up of his herd of milking cows, let the breed be what it may. It must be borne in mind that the stock from a crossbred bull are almost invariably inferior to himself. The produce of a pure bull and an ordinary cow will often surpass in many points the high-bred sire, as the offspring often partakes of the character of the purest and oldest blood. To prove the value of a sire it has been known for a very inferior class of cross black Welsh cows crossed by a pure Shorthorn bull to produce a very respectable herd, free entirely from the black color, and with a crossbred bull put amongst the improved herd the black color of the Welsh strain returned to the progeny. A good dam and granddam go a long way to establish quality in a bull. Pedigrees have been bought at great ransoms. What is wanted in an animal is pedigree and breed thrown in. By recording for a time the quantity and quality of milk yielded by cows, along with attention to milking points, and crossing these animals of superior quality with a well-bred bull, the value of the herd would be undoubtedly raised to a profitable and creditable strain.

Points Looked for in the Examination of a Dairy Bull and Cow.

BULL.

Milk Secretion.—The space adjacent to the shoulderblade of the animal should be well pitched; if rounded and meeting well down to the hocks, the hips as a rule are fleshy and lack in udder capacity.

The embryo teats should be well placed, skin underneath the belly full and fine-haired, milk veins well developed with strong entrance through the abdominal wall, hips "cat-hammed."

Nerve Strength—Forehead broad and dished, junction of spine and skull wide, eye full and expressive, large backbone.

Strong Digestion.—Muzzle broad, wide spacing of ribs.

Cow.

The umbilical attachment should be large, good depth through the heart and lungs, legs well apart, skin mellow and pliable, neck fine at its junction with the head and rather long and slender, eye large, full and expressive, forehead broad, enlargement of bones about the eyes, spine large and well defined. Most of these points indicate force of nerve which will afterwards be seen to be of the utmost value to the milking cow.

Digestion.—Large muzzle, ribs well sprung and deep, space from hipbone to the last rib should be wide, distance from hip bone to centre of udder great, hook bones wide apart.

An animal with a tucked up body will probably have a short milking life.

Milk Secretion.—Buttocks wide for udder development, udder well back upwards and forward, and of a rounded shape in front and behind. Teats well set apart and hanging perpendicularly; hair fine on udder, showing increased flow of blood; milk veins well developed, with good entrances through the abdominal wall, when increased in size and number indicates a strong force of blood to the heart.

Long Milker.—Withers sharp, quickly sloping, not rounded as in beef cattle. Appearance of animal wedge-shaped, observed when looking in front or down upon the cow, and increasing in width and depth backwards.

There are other points of note, one carrying a good deal of importance among many farmers, namely, the escutcheon, which seems to be well pronounced in the Holstein breed. A peculiar point is often to be found in the Ayrshire calf, the presence of a notch in the ear, but whether this indicates increased value is not understood.

The Importance of Strong Nerves and Good Digestion.

A cow giving a large quantity of rich milk is expected to eat largely, digest and assimilate well, and expend additional force in elaborating the milk from the large quantity of blood produced from the abundance of food consumed. We presume that milk is formed partly by the filtration of blood and partly by the breaking down of epithelial cells in the glands of the udder, food governing the former, and nerve energy the latter. With vigorous digestion and strong nerve energy the cow will be provided with the two necessary adjuncts towards the formation of a large supply of milk. It is of the utmost importance to pay strict attention to points indicating the digestion and nerve power of cows. When the nerve temperament of a cow is disturbed what is the result? Quantity and quality of milk is reduced. Let us take examples in milking, feeding, exposure, disturbance by dogs, transmission of cows by road or rail, and suckling of calves.

When a cow is roughly milked and harshly spoken to during the operation of milking, there is an immediate decrease in both quantity and quality of milk, and when this treatment is persisted in, permanent injury to the milking qualities of the cow is effected. The same takes place when cows are chased and disturbed by dogs. In feeding, a cow may be receiving a rich ration, expected to yield a high standard of milk. If the food is disliked by the cow, although always partaken of, the flow of milk will become retarded. By changing the ration to one of much poorer quality, but relished by the cow,

the yield of milk will become increased. With exposure to cold, chilling, or damp weather, the flow of milk invariably drops, no doubt partly caused by the extra consumption of food required to supplant the additional loss of heat. A striking example of this was recently observed in the testing of dairy cows by Mr. Potts, at the Grand National Show, at Tatura, in Victoria. Three cows were tested, giving on an average 9.4 per cent. of butter fat, equal to a weekly average of 23.84lbs. of butter. The cows remained in the show yard all night, and as the night was cold a drop in the quality of milk was expected, the morning test only recording the low percentage of 3.6. It may be mentioned that the first prize cow is from a Shorthorn cow by a Jersey bull, the second and third are out of Shorthorn dams by an Ayrshire sire. This may be cited as an example of careful breeding and feeding.

Proceeding on to the influences of transmission of cows by rail or road, say, to a show yard, we find the milk yield disappointingly below the cow's average. How often do we find a cow nourishing a couple of calves, and with the calves removed from the cow in her full flow of milk, she does not give as much milk to the milker as would nourish one calf. Changing from one paddock to another influences the quantity and quality of milk to a surprising degree. The question may be asked, what does all this mean? It seems to point to disturbance of the milk glands, and if the glands are under the government of the nerves, consequently the milk-making machinery must become somewhat inactive, in its turn causing a reduction in the yield and quality of milk. Is it not common for a cow to keep up her milk during milking? We hear of the sensible milker trying to excite the activity of the glands by gently rubbing the vessel and upper part of the teats, also using every gentle means to soothe and bring about contentment in the cow. All this is done to reduce nerve derangement and excitability, perhaps the result of a natural weakness and timidity, or brought on, as is too often the case, by illtreatment. I feel inclined to think that milk is being made during the process of milking, and is not already formed, as we are led to believe, in the bottom of the udder ready to be removed by the outlet tubes. One is further convinced by scientific reasons, and also knowing that milk strippings contain a much higher percentage of butter fat than the first-drawn milk tends to confirm that contention.

Feeding Experiments.

Feeding cows according to their individuality and milking capacity is advocated and practised by a few dairy farmers. The matter of supplying artificial feeding receives little or no attention, and quite a number of valuable milkers have declined into worthless animals, unsuitable for any dairy purpose. To support statements strongly advocated to the dairy farmers of this colony, and pertaining to the raising of the standard of dairy herds, as attention to breeding, feeding, milking, and general treatment, I feel pleased to afford satisfactory practical evidence of the value of such attention so profitably carried into effect and forwarded by Mr. Wyllie, of Kapunda, whose statements are in accordance with science and borne out in practice. Mr. Wyllie at present owns a very creditable herd of twenty-two dairy cows, their standard of excellence having been gradually raised from a poor class of cattle to their present position, and acquired by thoughtful study in the laws of breeding and rearing, as enumerated in this paper.

The following abstracts are taken from Mr. Wyllie's letter:—"I weigh every cow's milk and feed each according to what she requires and is able to turn to profitable account, then every cow yields a profit besides the gain in having them in a healthy condition of body. Every cow possesses a capacity, and beyond that she cannot go, which I proved by giving some of the animals extra feed, with the result that they went back in milk and in quantity of

butter. Feeding and milking cows at recognised and regular times produces greater yields and better results, more particularly in butter. The cows remain perfectly quiet until feeding time, but when delayed excitement is caused, with a corresponding loss of produce. I have proved that it is a good plan to feed and milk each cow in her turn; they soon learn it and will keep it without any trouble. Some of the benefits of this system are if you have to change the feed at any time you know the result and can keep a more uniform flow of milk.

"Results for the year 1896.—Eighteen cows, average quantity of milk, 547½galls.

"For 1897, twenty cows, average 720galls.; and for the year 1898 it will be considerably more. By records kept, we find that the mid-day milking gives the largest percentage of butter-fat, and this present year will be above any past years, owing to improving our methods of dealing with our cows and their produce.

"One day's ration for twenty-two cows, November 8th—refined molasses, 25lbs.; bran, 6½lbs.; pollard, 18lbs.; copra cake, 20lbs.; chaff (best), 60lbs.; salt, 4lbs.; water, 65½lbs." This is in addition to the natural herbage.

Mr. Wyllie also states that the cows drink, on an average, 10galls. of water per day, as indicated by the meter reading. The quantity and quality of water given is of vast importance to the quantity and purity of the milk and health of the cows. A French authority relates the following experiment. In experimenting upon cows fed in the stall with dry fodder that gave only 9qts. to 12qts. of milk a day, when this dry food was moistened with from 18qts. to 23qts. of water daily their yield of milk was increased up to 12qts. and 14qts. a day. Besides this water taken with the food, the cows were allowed to drink the same as before, and their thirst was excited by adding a little salt to the fodder. The milk was of good quality, and the amount of butter was satisfactory. The experimenter found by a series of observations that the quantity of water habitually drank by each cow was a criterion to judge of the quantity of milk that she would yield. A cow that does not drink as much as 27qts of water a day is a poor milker, giving only 5½qts. to 7qts. a day; but all cows which drank as much as 50qts. of water daily gave from 18qts. to 23qts. of milk daily.

Regularity in Milking.—Mr. Wyllie pays strict attention to this operation. Where a large herd of cows has to be dealt with it is a good plan to let every milker have the same cow to deal with every night and morning, and where it can be conveniently done, a point should also be made of getting each milker to begin every time with the same cow, and then take others in consecutive order from day to day. This regularity induces a sort of expectancy in the cows, with the result that they become prepared for being relieved of their milk as soon as their turn arrives. Cows get used to their milkers, and always do better if handled by the same person than if dealt with by different individuals from day to day.

Feeding.

In the plentiful season of the year milk cows are gorged with food, and starved in the dry summer, when green growing feed is scarce. Undoubtedly the flush of food will enable animals to gain in flesh and build up a stronger foundation to withstand the consequences of drought. When animals are in good condition moderate feeding will parry them through a trying season, and the profit gained will amply repay the thoughtful owner. At present the value of produce is somewhat discouraging. The quantity of milk is good, but rather low in quality. As the season advances food will gain in maturity where it is not already scorched. Prices will rise and quality of milk become

enriched. The energetic farmer, through a little addition to the moderate routine of farm labor, will have provided, where the district is suitable, a store of green feed at a little cost, and to be utilised when season demands it. The question is always raised: How is it possible for us in a scorching climate to provide food for milking cows throughout the year? Many districts are quite unadapted for cropping, still in the spring tons of rank green herbage could be conveniently made into silage and not allowed to remain on the ground to become converted into a dry fibrous and almost worthless forage. Were the opportunities of silaging taken advantage of a decrease in the number of cases of impaction and the mortality amongst milking cows would be observable. In a number of districts the cropping of lucern and sorghum could be increased, and in tracts amongst the hills few obstacles remain in the way to mar the successful growing of valuable root and fodder crops with the assistance of a system of irrigation.

Diversities of opinion exist regarding the influence of food upon the quantity and quality of cows' milk. Exhaustive experiments have been carried out in various countries, and scientific and practical men have had repeatedly to face confronting exemplifications of their theories. We are all aware that a cow must be fed to keep up her vitality and promote the formation of milk; still we know that to feed with a direct intention of increasing quantity and quality is a matter almost beyond our power. What circumstances generally follow when a cow is nourished in advance of her bodily requirements? With a continuation of high feeding we find that a diminution in her milk secretion invariably takes place. This is referred to in Mr. Wyllie's letter. Why should this condition follow? A cow is not a machine. Individual animals, and to some extent in breeds, possess a special physical conformation capable of elaborating fat upon their bodies and utilising only a little food for milk formation. One animal has a greater natural power within her towards beef production, her food as converted into blood in nourishing the body deposits its greatest wealth in the accumulation of flesh. As a breed, we may take the Hereford as a good example. With a cow having a fattening tendency her attainments as a milker will be poor, as the milk glands will be rendered less active, brought about by a fattening of the tissues of the udder. Opposed to this again, we have individual cows and breeds where the demands are greater upon the blood towards the production of milk, and those are our heaviest milkers but poorest in flesh—example, Jersey breed. In the Shorthorn with their combined qualities we observe wherein liberal feeding becomes necessary to support the double demands of milk and flesh. Generally speaking, a cow fed upon a high ration can only take from the blood, according to her individuality, those ingredients to raise the standard of her milk for a short period above the normal. When a continuation of the enrichment of the blood is kept up by abnormally high feeding, the surplus enrichment is converted into flesh in both body and udder. If the excess be from carbonaceous matter it will go to form fat, if from nitrogenous matter it will go to form flesh. Food containing a high percentage of water with a quality insufficient to fulfil the requirements of the cow will increase the flow of milk for a short time, but will fall back to normal milking, and if the feeding is continued it must still decrease.

The variation and composition of crops depends upon the following:—

The Stage of Maturity.—Fresh raised mangolds are not very wholesome for stock, as they contain acrid ingredients. An extended period of ripening is necessary when substances known as pectose and pectin are changed into sugar. Old mangolds are therefore richer than new, and they form a very wholesome food for all kinds of stock, especially milk cows.

Soil and Season.—Good soil means good quality; sunshine better maturity and ripeness.

Manuring.—High artificial manuring increases luxuriance and bulk, and retards maturity. If exposed to a period of strong sunshine and hot winds when at the maximum immature condition, loss is sustained, as maturity is checked.

Harvesting Processes.—Exposure to moisture and heat causes loss of the soluble constituents.

Storing.—In making silage the mature food compounds are somewhat reduced in quality, and the loss is greater with sour than with sweet silage.

Ripening.—Young hay is more nutritious than old hay, having less fibre.

Circumstances Affecting Digestibility.

With a starving animal no more food will be digested than when moderately fed.

Of two animals of the same breed, age, and condition, one may digest more of the same food than the other.

When the diet is very abundant and rich there is less digested.

Cooking food does not always make it more digestible.

Boiling water added to food increases the digestibility of the fibre.

The addition of one food to another may alter the rate of digestion of the first food.

The hay at cutting time is less digestible than when in the young condition.

The flesh-formers of heated hay are less digestible than when not heated, but the fibre is more digestible.

When hay is well harvested its digestibility is not less than the digestibility of the green food prior to making.

When milk cows are receiving dry feeding, as chopped hay mixed with bran and copra cake, it is advisable to have this moistened with warm water the night previous, for the reason given above, and to keep up the flow of milk. The addition of molasses as a food strengthener and medicine in dry seasons should never be dispensed with; it has been the means of preventing the death of many cows.

Foods Affecting Flavor of Milk.

Lucern when given in quantities in the green growing state. To overcome the error, feed sparingly or cut the lucern and allow it to wilt a few hours prior to feeding. Lucern is one of the heaviest croppers and richest nitrogenous fodder plants known, which makes it so valuable as a food for enriching milk.

Rape.—It is grown for its leaves, which are abundant and of high feeding value, containing over 3 per cent. of nitrogenous matter, and 13 per cent. of organic matter. It is an unusually quick grower, but must be given in small quantities or mixed with other food.

Cabbage.—This crop can be cultivated upon very stiff soils, and is, perhaps, the most luxuriant of all vegetable productions when grown under favorable conditions. In many of the hill districts the cultivation of the cabbage would be attended with success. When liberally fed to milk cows the milk contains an objectionable flavor. When cut to pieces cabbages can be successfully ensiled.

Silage.—Silage can only be used with success as a supplementary, and not as a chief food for dairy cows in milk. When used in moderation and mixed with hay, chaffed or otherwise, it causes an increased flow of milk, the butter from which has a superior color and flavor. Sour silage as a rule produces more milk than sweet silage, but the latter is recommended for milk cows,

Foods Endangering Cattle.—When cows are admitted to feed liberally upon green lucern distension of the first stomach generally follows, more especially if the lucern is damp. Without attention to bad cases death usually takes place.

Sorghum is said to possess poisonous properties, and causes inflammation when fed to stock. The greatest danger is in giving the animals too much of the sorghum, especially after a continued feeding upon dry fibrous herbage where there has been a scarcity of water.

Succulent feeding, natural or artificial, is of greatest value when cows are exposed in dry seasons to conditions favorable to the disease of impaction, which has carried off so many cows in past years.

Feeding of Calves.

The best way of feeding a calf for its own welfare is to let it run with its mother and feed itself. The mother's milk forms a complete food, and the best till the calf learns to graze; but this is not as a rule an economical method on the dairy farm, and is only adopted with valuable pedigree stock, or, if for commercial purposes, two calves are sometimes suckled on one cow. To lay the foundation of a good constitution in the young calf liberal and nutritious feeding must be given. To feed entirely upon skim milk without supplementing anything for the removal of fat leads to a stunted animal; very often a poor milker.

Method of Feeding.

1. *Hand-feeding with Full Milk.*—The calf must always receive its mother's first milk, called colostrum or teastings. It is thicker than the succeeding milk, and has a purgative action, which causes the first motion of the intestines of the young calf, and clears them out. The calf should receive about 1 pt. of milk fresh from the cow three times the first day, or every four or five hours, the milk being at a temperature as it comes from the cow. On the second day increase to 3 qts., and at the end of the first week the calf should receive 1½ gal. The mid-day meal can now be dispensed with and the feeding gradually raised to 2 galls. per day by the end of the fourth week, at which it may remain till the tenth week, when the calf may be weaned by gradually reducing the quantity and stopping the milk altogether when the calf is twelve weeks old. These quantities are suitable for Shorthorn calves or for those of the large breeds; a good deal less would do for smaller. This method of feeding, however, is too expensive for ordinary purposes.

2. *Skim Milk Feeding.*—The calf should be fed the first week upon whole milk, as already described, afterwards skim milk warmed up to 90° F., and to be gradually substituted. As skim milk differs from whole milk in having the fat removed, it is necessary to raise the standard by the addition of such foods as linseed, oat, and pea meal. In doing so begin with a small cooked quantity to each diet, as the calf's digestion is easily impaired, and gradually increase to 1 lb. per day till the calf is two months old. At two months the meal may be increased to 1½ lb. per day until the end of three months, when the calf will be able to support itself on natural feeding.

Skim milk is to be given in the same quantities as prescribed for the whole milk feeding.

Feeding with Whey.—Whey is a very poor feeding substance, as it has lost almost all the fat albumenoids and mineral matter. The chief feeding constituent is the milk sugar. To restore the substances taken from the whey a mixture of the above-stated meals would be suitable. One-quarter of a pound may be treated in hot whey, added to 1 gall. of whey and given to a calf ten days old. At the end of two or three weeks another ¼ lb. may be added to the same quantity of whey, and this increased as is considered necessary until the calf is three months old.

TUBERCULOSIS.

An interesting address was lately delivered at Keswick, at a conference of medical men, veterinary surgeons, and representatives of sanitary authorities in Cumberland and Westmoreland, England, by Professor Délépine, Professor of Pathology, Owen's College, Manchester, on "Tuberculosis and the Milk Supply." This address is of particular interest to the inhabitants of Adelaide and its suburbs.

"Professor Délépine, who was warmly received, said a fight against tuberculosis means a serious financial problem, and in the present state of things it would involve losses affecting chiefly our agricultural interests. This would not be right; it is not reasonable that, in order to protect the public generally, one or two classes of the community should be made to suffer. At the present day there is perhaps in this country not a herd of cattle, a cowshed of any size, which is free from tuberculosis, and there must be very few milk shops from which tuberculous milk is not issued from time to time. Some enlightened cattle owners have, it is true, tried to eradicate tuberculosis from their estates, but, though in the long run they will reap the benefit of their right action, the initial cost has been such that others have not been encouraged to follow their example. Much may be done by private enterprise; but, as a matter of simple justice, it seems to me that the first cost of a general fight against tuberculosis must be borne not only by the raiser of stock, the dairy farmer, the cattle dealer, or the dairyman, but also by the consumer, for whose protection these measures have to be taken. It might be difficult to apply the necessary regulations to the whole kingdom, but it should be possible, by stringent measures applied locally, to get rid of all tuberculous cattle, and clear all infected places in, say, a county or a combination of counties. This being done, it would then be possible to make any person introducing tuberculous cattle in such a district responsible for such an action. Having myself studied tuberculosis for many years, I am more and more convinced that tuberculosis must be considered a serious public danger. In order, however, that you should be able to form an opinion for yourselves, I now bring before you evidence from which you will draw your own conclusions as to the nature and extent of the danger. The lecturer then proceeded to demonstrate by a number of remarkable lantern slides the ravages wrought by the various forms of tuberculosis, as pulmonary consumption, tubercular meningitis, tabes mesenterica, scrofula, lupus, bone and joint tuberculosis. Regarding the frightful disfigurements caused by lupus, he said these effects, which are so evident when they are manifested on some superficial part of the body, are also found in internal organs. Thus, in a tuberculous lung or kidney you may find cavities due to ulcerations similar to those shown disfiguring the faces of patients affected with lupus. There is not a part of the body which entirely escapes this dreadful disease, and whatever organ it attacks it gradually transforms it into a mass of useless inflammatory products, which in their turn die and crumble away. The nature of the process is well known in early stages of tuberculosis in the intestines and liver. All these lesions are the work of the tubercle bacillus. Slides were shown illustrating a cell containing bacillus from the lungs, a growth of bacilli on glycerinated media, a pure culture under the microscope, and the remarkable resistance of the tubercle bacillus. There were also illustrations of tuberculosis produced in guinea-pigs by inoculation of pure cultures, and pictures were exhibited showing the effects on intestines of guinea-pigs inoculated twelve days and thirty days previously with tuberculous matter. The Professor here showed pictures of three guinea-pigs which had been inoculated with a very small quantity of

Manchester milk, and which showed typical tuberculous lesions of various degrees. We have not, he proceeded, even the consolation to think that a disease which produces such frightful ravages is rare, for if we consult statistics it becomes evident that tuberculosis must be considered a very frequent disease. Even at the present day, when, by improvements in sanitation, the disease is less frequent in the lungs than it used to be, it is found still that one-tenth of all deaths are due to pulmonary phthisis alone. Thanks to numerous researches which have been made during the last thirty-five years, we know exactly how this disease is produced. Before that knowledge had been acquired, it was impossible to deal with tuberculosis in an efficient way; there was then an almost general belief in the heredity of tuberculosis, a belief which has not quite died out yet, though it should have been dead long ago. The contagious nature of tuberculosis was overlooked by most people, and barely believed in by a few. Now, on the contrary, we have absolute proof that the disease is produced by nothing else than the bacillus. Its development may be favored or not by the age, the state of health of the victim, and by external circumstances, but it remains the cause of the disease. The tubercle bacillus may penetrate the body in various ways, but the two most important channels of entrance are the air and the food passages. Through the first the air carries to the lung dust loaded with the tubercle bacilli. In the alimentary canal, foods, such as tuberculous meat, and more frequently tuberculous milk, are the carriers of the germs. Owing to the great frequency of pulmonary tuberculosis in the adult, and the great mortality due to it, some observers have minimised the importance of infection through the alimentary canal; but in the case of infants it is impossible to doubt the importance of this channel of infection. Judging from statistics in our hands, it is evident that tuberculosis of abdominal organs is far from infrequent in children. Infants begin to be seriously affected with *tabes mesenterica* (a kind of consumption of the bowels) when they have reached the age of six months, *i.e.*, when most of them have begun to be fed on other foods than their natural food, and more especially on cow's milk. In half of the children dying from any cause during the second year of their life, tuberculosis lesions can be found. In a large proportion of these cases there is good evidence to show that the bacilli have entered through the alimentary canal, and must have been introduced with cow's milk. We are bound to admit the importance of infection through the alimentary canal, and this danger will evidently be proportionate to the amount of tuberculosis in cattle. By putting together figures collected in England, France, Germany, Denmark, and Holland, and based on the examination of some 600,000 head of cattle, I find that, on an average, more than 16 per cent. of all cattle must be tuberculous. Some important German returns give 15 per cent., Danish statistics give 17.6 per cent. Recently, in Manchester, Mr. King, the chief veterinary inspector, found, on inspection of cattle throughout the Manchester abattoir, that 41 per cent. of the cows were affected with tuberculosis. Taking all the cattle examined, it was found that about 28 per cent. were tuberculous. It is well to remember that certain cowsheds have been found so completely infected that 80, 90, and even 100 per cent. of the cows kept in them have been found to be tuberculous. It is, however, fortunate that the milk of tuberculous cows does not usually become infectious unless the udder be diseased. And it is still more fortunate that the udder becomes affected only in a small proportion of tuberculous cows. Yet it must be remembered that it is impossible to tell when the udder of the tuberculous cow is likely to become affected. In Manchester it would appear that six out of thirty-six very tuberculous cows examined by Mr. King had tuberculosis of the udder. I have examined specially the milk of twenty-nine tuberculous

cows in which the disease was advanced, and found that in six of the cases the milk was capable of producing tuberculosis. I may say, however, that in five out of these six cases the udder was certainly diseased, and in the sixth disease was probably present. So that unmixed milk, taken from tuberculous cows kept in Manchester byres, proved to be capable of producing tuberculosis in 25 per cent. of the cases examined, *i.e.*, in one out of every four. Evidence of this kind shows that we have to deal with a real danger. It is, however, seldom that the unmixed milk of a tuberculous cow reaches the consumer, except in the case of children and invalids; and it might be argued that, after being diluted with good milk, tuberculous milk ceases to be a source of danger. This point has been tested both in Liverpool and in Manchester, and, as I have assisted the medical officers of health in this work, I am able to tell you what I found. The milk was collected at the railway station immediately on its reaching town. No less than 6 or 7 per cent. of these samples of milk were capable of producing tuberculosis, without speaking of the diseases produced also. This infectious milk may be less dangerous to adults, but I have no doubt that a very large number of children are killed by it every year, and that adults would be the better for not using it. The danger being admitted, what shall I say in regard to the remedy? I can only suggest the direction in which measures would prove efficient. A question of this kind is more of the department of an administrator than of a scientific investigator. The first general measure which can be recommended for the purpose of combating tuberculous infection from milk is in the hands of the consumers. It consists of boiling all milk used. There is a strong prejudice against this boiling of milk. For my own part, I think the defects of boiled milk have been exaggerated. I know families who, on my recommendation, have drunk nothing but boiled milk (except in their tea) for the last twelve or thirteen years. I have watched children who have practically never drank any unboiled cow's milk from the time they were weaned to the present day, in one case for twelve years and in other cases a little less, and these children have never suffered from the use of boiled milk. The great objection, however, to this easy remedy is that it does not protect us against tuberculous cream, butter, and cheese; nor does it mitigate the dangers of infection due to the presence in our midst of so many tuberculous animals. The second method of dealing with the milk so as to protect the consumer is to analyse samples from time to time, and to reject from our markets all milk that is not free from infectious properties. This method is not a practicable one. It is easy to detect common adulterations by simple chemical tests, but it is another thing to find whether a sample of milk can produce tuberculosis or not; this may take days, and meanwhile the consumer is not protected. We must turn to the actual source of the milk, the cow, and see that it is not allowed to contaminate our milk supply. This means systematic inspection of our cowsheds and milch cows by competent men able to detect tuberculosis even before it has produced symptoms obvious to all. A careful veterinarian can now, by the application of the tuberculin test, combined with a thorough inspection, almost always determine whether a cow is tuberculous or not. As it is impossible to say when the udder of a tuberculous cow will become diseased, the milk of all tuberculous cows should be excluded from the market. After being sterilised by boiling or otherwise, this milk might still have a good commercial value. This method of inspection would free our markets from the greater part of the tuberculous milk which at present reaches them, yet this would do little towards stamping tuberculosis out. Tuberculous cows and tuberculous sheds would still remain a source of infection. It would therefore be necessary to separate the tuberculous cows from the healthy ones, to fatten all tuberculous cows for slaughter whenever the disease has not

reached serious proportions, to disinfect thoroughly infected sheds, and to improve their construction, so as to allow of their being thoroughly cleaned, lighted, and ventilated. All cowsheds should be inspected at least twice a year, and the few tuberculous animals which would have escaped previous inspections weeded out. The breeding of healthy cattle should be encouraged, and calves would be easily protected against a chance of infection if the preventive measures above mentioned were taken. The presence of tuberculous servants should not be tolerated either in the shed or dairy. The milk pails and cans should be kept scrupulously clean. Of all the measures I have mentioned, two seem to me essential; first the systematic and periodical inspection of cowsheds and byres, for the purpose of weeding out tuberculous animals; second, the testing of all cattle brought into the area of a given county, so that other sources of tuberculosis should not be introduced. If such methods were adopted it would then be only right to see that foreign dairy produce is not allowed to flood our market unless good guarantees were obtained that proper measures had been taken to safeguard the consumer. Before concluding, I wish it to be distinctly understood that I am well aware of the great difficulties besetting the administrative side of this question. I have simply tried to indicate how the assurance may be obtained. I repeat again that I think it would be absurd and unjust to expect any special group of persons to bear all the expense of dealing with tuberculosis. It is a public question affecting all interests. It is a great danger, and considerations of economy cannot indefinitely interfere with what may be considered an important public duty. Delay means more deaths and increased expenditure."

WEATHER AND CROP REPORTS.

AMYTON.—Since last report we have had a deal of boisterous weather, knocking down some wheat and causing the grain to shake out. Reaping is general, the returns varying from 10lbs. to 90lbs. per acre. Most farmers will reap sufficient for seed.

BALAKLAVA.—The last few days of October were cold and wet, about an inch of rain falling, which helped the filling of the grain, which appears a much better sample than last year's. Reaping is becoming general through the district. One crop reaped and cleaned went 14bush. per acre, but the average for the district will not be more than half that. Heavy winds have knocked down or shaken out a lot of grain.

BRINKWORTH.—Reaping has commenced, some crops being worth 13bush. to the acre, and this will be exceeded in a few instances where the seed and manure drill has been used.

INKERMAN.—The weather during the month has been very thundery, with frequent light showers—about $\frac{1}{2}$ in. in all. Reaping is general, and two bags to the acre is being obtained by some, though the average will be considerably lower.

KAPUNDA.—Haycutting is about finished, but the windy weather retards carting and stacking. The greater portion of the crop has been cut with the binder. The wheat crops are looking much better than they did about the middle of October, the rainfall since then accounting for the improvement.

LUCINDALE.—Fine rains have fallen this month, beginning with light showers, and ending with heavy rain and severe squally weather, also several hailstorms. Crops are promising well, and a fine hay yield is now assured. Frosts have severely damaged potato crops. Shearing is now in full swing, but has been delayed by the rough weather. The clip is beautifully clean and bright, and fairly heavy. Stock very healthy, and in good order generally.

LYNDON.—The weather has been very rough and wet, causing a good deal of damage to crops.

MOUNT REMARKABLE.—Reaping is becoming general. Some crops will go 15bush., others about 6bush. Owing to dry, windy weather, much fruit is falling from the trees.

MURRAY BRIDGE.—Unfavorable harvest weather has been experienced, it being very rough and windy. All late sown crops will yield poorly, but the fallowed and manured fields have held their own well, and promise to give good returns. The sample will be superior to last year's. Stock are in good condition, and feed is fairly plentiful.

NANTAWARRA.—Rainfall since last report 0.82 in., making a total up to date of 13.39 in. Rough weather has been experienced during hay time, which is about finished. Reaping is

now being pushed on with; some of the early varieties of wheat which have been drilled are promising a good return, but very few people have cleaned up. Stock looking well, but grass has dried off.

NARACORTE.—Weather has been very unsettled; strong winds and little rain.

ONE-TREE HILL.—The weather during the last fortnight, with the exception of one or two days, has been very mild and cool. This has had a very beneficial effect on the crops. Haymaking is in full swing. Most of the crops as usual will be cut for hay. Feed is abundant.

PINE FOREST.—Since last report we have experienced very heavy gales, which have knocked at least 4 bush. per acre out of some of the heavy crops. Haymaking is about finished, the yield being better than last year. Reaping has commenced, some crops going 13 bush. per acre. The drilled crops are expected to average 9 bush.

PORT ELLIOT.—November has been fairly cool, but very windy. Apricots and plums promise to yield well, but the apple crop is disappointing. Haymaking is about finished. The grain crops on the whole are promising. Early potatoes are light, owing to dry September.

REDHILL.—Reaping is general. A few paddocks are returning four bags, but the average will scarcely be above 5 bush. per acre. The heavy storms of wind have shaken out a lot of Early Para and Steinwedel wheats, and knocked down some of the heavy crops.

STRATHALBYN.—The crops have improved very much during the month, but will not be heavy. The weather during the month has been very changeable, boisterous winds predominating and nullifying to a considerable extent the effect of the showery weather.

WOODSIDE.—Since last month's report we have had over an inch of rain, the greater part of which fell on the latter part of October. Haycutting has commenced, and good crops are general; feed is plentiful, and stock are fat. Shearing is over, and a good clip has been obtained.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

November 30th, 1898.

An unusually cool and stormy November experienced, with a good deal of coastal rain and heavy gales during the latter week, keeping the temperature very low. Severe hailstorms have done considerable damage, particularly to the fruit crops, which, generally speaking, must be very poor this season. The rain will do good, however, by freshening up growing feed, and replenishing stores of water.

General business continues to be very quiet, with extreme dulness in drier agricultural districts where the harvest is proving a failure.

In the grain trade business during the month has been dull in all lines. Breadstuffs only dealt in sparingly. Local millers having as much old wheat as required, in face of the commencement of deliveries of new, have reduced their buying prices 3d. to 6d. per bushel. The sample of new wheat forward is not up to average, although as deliveries yet have been light, it is somewhat early to form a decided opinion. It is certain, however, that with the cool weather that has prevailed the late crops will be very much better, both in yield and quality. Latest London cable reports show that market there has receded almost to the point ruling a month ago, and the positive information now establishing the fact that the Argentine is harvesting a record crop, along with the improved Australasian prospects, does not at present give much probability of an early advance in price. Freight has again stiffened, and accepting as correct that cable report from London of a sale of South Australian wheat at 30s. 3d., shipment from here next or following month, this makes the present ruling rates as being very nearly export value. Bran and pollard have been active, with firming tendency, but the re-starting of mills for the new season is causing an easing in offal lines. Feeding grain, as well as hay and chaff, are dull, there being an abundance of growing feed throughout the country.

Potatoes during the month have been famine-scarce, at times absolutely unobtainable by contractors for their supplies. The new crop, however, is being dug more freely and quantities show increase with consequent easing in price, though still relatively very high. Local onions are plentiful and have further cheapened.

In lines usually classed under the heading of dairy products a full month's trade has put through, although in butter, supplies show a steady decrease. Quality usually deteriorates as we get into summer, and notwithstanding weather conditions have been cooler this season, northern consignments particularly have begun to deteriorate somewhat, thus establishing an increasingly wide range between first and lowest grades, with a tendency to stiffening in price of better sorts. Small weekly shipments to London are still being made by each mail steamer, and may be expected to continue till the end of the year. Eggs have fluctuated considerably, a drop of 25 per cent. occurring a couple of weeks ago, part of which, however, has since

been recovered. It is rather difficult to forecast the probable movements, but the usual Christmas orders, both local and for export, should at least maintain present rate. Locally-made cheese shows decided improvement in maturity of sample; but quotations are easier, so that demand for imported has ceased. Bacon also is lower, but sales are increasingly heavy. Honey in better request. Beeswax scarce. Almond kernels have advanced slightly; softshells unchanged.

Poultry has been penned in increasing quantities at each sale, and slight fluctuations apparent, but values on the whole have ruled very satisfactory to consignors.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, old, 3s.; new, 2s. 9d. to 2s. 10d. per bushel of 60lbs.
 Flour.—City brands, to £9; country, £8 to £8 10s. per ton of 2,000lbs.
 Bran and pollard.—8½d. to 9d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 5d. to 1s. 7d.; stout white, 2s. 6d. to 2s. 8d.; imported, nominal, 3s. 6d. per bushel of 40lbs.
 Barley.—Malting, 4s. to 5s. 3d.; feeding sorts, 1s. 8d. to 1s. 10d. per bushel of 50lbs.
 Chaff.—£2 10s. to £2 12s. 6d. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—New local, £10 to £10 10s. per 2,240lbs.
 Onions.—£5 to £5 10s. per 2,240lbs.
 Butter.—Creamery and factory prints, 8½d. to 9½d.; dairy and collectors' lines, 5½d. to 7d. per pound; best bulk factory, 8½d. to 9½d., chilled, f.o.b.
 Cheese.—S.A. Factory, large to loaf, 6½d. to 7½d. per pound.
 Bacon.—Factory-cured sides, 7½d. to 8d.; farm lots, 7d. to 7½d. per pound.
 Hams.—S.A. factory, scarce, 8d. to 11d. per pound.
 Eggs.—Loose, 8½d.; in casks, f.o.b., 9½d. per dozen.
 Poultry.—Good young roosters, 1s. 9d. to 2s. each; hens and medium roosters, 1s. 4d. to 1s. 6d.; chickens, 1s. to 1s. 4d.; ducks, 1s. 6d. to 2s. 5d.; geese, 2s. 6d. to 3s.; pigeons, 6d.; turkeys, 6d. to 7d. per pound, live weight.
 Lard.—In bladders, 5½d.; tins, 4½d. per pound.
 Honey.—2½d. for best extracted, in 60lb. tins; beeswax, 1s. 3d. per pound.
 Almonds.—Soft shells, 3½d.; kernels, 10d. per pound.
 Gum.—Best clear wattle, 2½d. per pound.

MILKING MACHINES.—There are now several types of machines in use, including the original "Thistle," which has been improved until it fills pretty well every requirement. In New Zealand the farmers seem to realise the value of these helps to a considerable extent. The *New Zealand Weekly Press* recently wrote:—"Mr. S. Knight, of Rongotea, Rangitike, has had fitted up a milking machine which enables him to milk his dairy herd of fifty odd cows, with two assistants, in an hour and three-quarters, whereas it formerly took him, with three assistants, three hours to milk the same number. The machine, which is fitted to milk eight cows at once, is the first in the district."

SMALL BIRD POISONS.—The Government Biologist for New Zealand recommends the following as effective small bird poisons:—*Strychnine*.—1oz. strychnine, 1oz. spirits of salts, 1lb sugar, 60lbs. wheat, 4galls. boiling water. Dissolve the strychnine in spirits of salts, then add the solution and sugar to the boiling water, stirring well. Pour in the grain, cover the vessel, and allow it to soak for forty-eight hours till the grain has taken up all the water it will, then spread out to dry and store in jars. *Arsenic*.—1lb. arsenic, 1lb. washing soda, 1lb. sugar, 2galls. water. Boil the soda and sugar, and, when boiling, mix the arsenic to the consistency of a paste, and add to the contents of the boiler; continue to boil for about fifteen minutes, and keep well stirred. Place about 40lbs. of wheat in an iron tub, and pour the contents of the boiler over it. Allow to stand till the water is nearly absorbed. Then dry in the sun and store in jars. One part *arsenic*, fifteen parts *cornmeal*, one part *sugar*. Stir all together dry, then moisten and lay. *Phosphorus*.—3qts. water, 4ozs. phosphorus, 3lbs. sugar. Boil the water and then add the phosphorus and sugar. When quite dissolved add as much wheat as the mixture will cover, and stir well for at least ten minutes. The birds should be fed on sound grain for several days before any poison is laid, as they are very suspicious.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, NOVEMBER 16, 1898.

PRESENT.—Mr. F. E. H. W. Krichauff (Chairman), Sir Samuel Davenport, Messrs. H. Kelly, J. Miller, and A. Molineux (Secretary).

Abnormal Growth.

The Secretary tabled samples of abnormal growth of wheat forwarded by Murray Bridge Branch. The stems instead of bearing only one ear divide at a joint about half way up and produce two separate heads, one of which fails to mature. It was stated that a large number of plants in one field were showing this development.

Government Dairy Bulls.

Mr. MILLER said, as far as he could ascertain, the bulls purchased by the Government were greatly appreciated by the various Branches which had been fortunate enough to receive them, and he would like to see more animals purchased, as he believed much good would result. It was important, however, that care should be taken to see that the animals were properly cared for and made use of. He thought regular reports should be furnished by those in charge of the bulls.

The Secretary said the Branches receiving these bulls on loan were responsible for their keep, care, and management, and undertook that the animals should be kept in well-fenced enclosures, and that their services should not be abused. Reports were furnished twice a year by the Branches.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

251. *Statistics.*—In the first five months of this year no less than 735 new co-operative agricultural unions were formed in Germany, out of which 517 were agricultural savings and loan banks, 88 butter factories, 34 unions for purchasing and for selling, 49 for breeding horses, 3 for cattle, 2 for selling fowls and eggs, 8 unions of vigneron, 2 for making preserves. The total number of unions was, in June, 11,768. I give here an instance of the magnitude of purchases made in 1896 by the General Union, viz.:—3,317,392cwts. of commercial manures and 980,056cwts. of commercial fodder. The Neuwied Union purchased 1,074,005cwts. of manures and 515,091cwts. of fodder. The number of sheep kept in Germany has been gradually reduced from 19,666,794 in 1875, to 7,859,096 in 1897. Goats have increased from 1,481,461 to 2,164,425, and cattle by nearly two millions, and pigs by 5,096,000. During the year, from March, 1897-8, no less than 18,845,000 pigs were slaughtered in the United States for exportation, valued at 179,075,000 dollars. Germany received from there 186,400,000lbs. of lard.

252. *A New Law against the Seeds of Weeds* has been passed in the United States which permits the Minister of Agriculture to examine grain and horticultural seeds offered for sale. If these contain more than 1 per cent. of bunt, ear cockle, certain bulbs, seeds of weeds, or insects, or they germinate badly, he can advertise the names of the persons who may offer them for sale.

253. *Sulphate of Ammonia and Nitrate of Soda.*—Professor Maercker sums up a long report on these two rival fertilisers, viz.:—“It is with them as with superphosphate and Thomas phosphate. You ought to use superphosphate where you want an intense action of phosphoric acid, and nitrate of soda for an intense action of nitrogen. Sulphate of ammonia, like Thomas phosphate, is preferable where slower action but of longer duration is of importance. Sulphate of ammonia is also as good as guano for brewers' barley; but oats demand nitrate of soda to give the most nourishing grain, rich in starch and protein. For winter wheat he recommends sulphate of ammonia, for spring wheat a top dressing of nitrate of soda. Professor Hutzler found that in 445 experiments 396 gave better crops with nitrate of soda than with sulphate of ammonia.”

254. *Sorbus aucuparia, var. edulis.*—The fruit was introduced into Germany in 1886 from the Sudete Mountains, and I obtained seeds for the Conservator of Forests a year ago. They

have been found to be so valuable for jams that the Department of Agriculture in Austria-Hungary has now established special nurseries for the multiplication of these trees alone. The fruit forms in bunches of twenty-five to thirty berries, which are mealy, and have a somewhat acid, yet sweet, taste.

255. *Green Manuring.*—Dr. Schultz, of Lupitz, has brought it before all others on his own poor sandy soil into a system, inasmuch as he has kept no cattle for the purpose of using their dung. He obtained the nitrogen and humus for his crops from the pea-flowering plants, using, however, large quantities of potash and phosphoric acid from fertilisers to enable him to grow these plants successfully; and with a view of ploughing them under. Lupins seem perhaps to be best of all, but I am not aware whether they have been used here to any extent, except near Wellington, as commenced by the late Sir William Jervois, and now by the Bremer Council, to prevent sand blowing. You may collect the earlier seed pods, without making the advantage to the soil much less for green manuring. They require, however, to be sown in March or April, and, not being fit for ploughing in before September, or even later, a whole season is lost, as you do indeed also when you have the land in bare fallow. To sow any other—that is, summer—crops for green manuring after the regular crop of cereals has been harvested has succeeded fairly well even in South Australia, but in such cases it has been harvested as cut fodder or fed off, and not often ploughed in. The subterranean part of the crop is, however, an improvement for the land; it enables the roots of the cereals to follow the channels left by the deep-going roots of many of the plants so grown, thus to find at the greater depth more moisture, and to withstand any dry period somewhat better. In sandy soil the advantages of green manuring are undoubtedly far greater than in the stronger soils. The largest quantities of nitrogen and organic substances have been found by Dr. Schultz in the following plants per acre, viz.:—

	Dry Substance.	Nitrogen.	Equal to Nitrate of Soda.
White peas.....	6,384½lbs.	178lbs.	11½cwt.
Blue lupin	6,285½lbs.	152½lbs.	nearly 10cwt.
White lupin	5,585lbs.	146lbs.	9½cwt.
Yellow lupin	4,513lbs.	114lbs.	7½cwt.

The blue lupin sends its roots deepest down, more so than peas or other lupins, and contains the largest number of nodules on the roots. *Lathyrus clymenum* goes still deeper with its roots and grows quicker and thicker than peas, but does not collect so much nitrogen. On soils with much lime *Lathyrus sativus* grows still quicker. Professor Dr. von Rümker recommends for potatoes, which are very partial to green manuring, to give with green manuring from 32cwt. to 64cwt. of stable dung per acre. The bacteria in the latter will accelerate the fermentation and rottenness of the green manure. In place of stable dung, 2cwt. of superphosphate and 1cwt. of nitrate of soda per acre are also mentioned as a suitable addition; but Thomas phosphate is unsuitable, it being as slow as the dissolution of the green manure, and the potato has but a short time to consume plant food. Potash is also not desirable for potatoes grown with green manuring; but if you put 6cwt. of kainit and 4cwt. of Thomas phosphate per acre, a short time before ploughing in the green manure, these fertilisers are said to be valuable as a supplement for cereals, unless the soil contains already much phosphoric acid from former years. The kainit is only wanted if potatoes are to follow the cereal crop, and if given some lime should also be added. Potash always makes the soil poorer of lime, but potatoes do not like lime, and in dry years still less, if it is given in any quantity direct to such crop. For green manuring thick sowing is very advisable. The plants are forced to grow high, bring few flowers and seeds, and thus form more roots, and also growth above ground. Peas and vetches are very good for a crop of green manure, where the subsoil is of a wet nature. I do not mention other plants fit for green manuring elsewhere, like clover, serradella, &c., as they seem even less suitable in our climate than lupins; but any plants that form in a short time a mass of soft leafy stems, like rape and even mustard, will improve the soil, although it may not receive the nitrogen leguminous plants only collect. In Europe and the United States the sowing on the stubble of short-lived plants for green manuring is considered yearly of greater importance. Here we desire communications from farmers successful with any plants for green manuring. I find that in a crop of 40,000lbs. of lupins per hectare, you obtain 200lbs of nitrogen; of 24,000lbs. of vetches, 120lbs; of 42,000lbs of white mustard, 200lbs; of 24,000lbs. of red clover, 120lbs. of nitrogen; of 30,000lbs. of serradella, 150lbs. Most interesting is, however, Professor Maercker's report upon green manuring, which appears in the *Illustrated Landwirtschaftliche Zeitung*, of July 8th, 1898, and ploughed in before a crop of oats. He found that one of six plots, where 100lbs. of horse beans, 200lbs. of Victoria peas, and 100lbs. of vetches per hectare had been sown and ploughed in, together with 2cwt. of nitrate of soda and 4cwt. of superphosphate per hectare, he harvested 41cwt. of grain and 74cwt. of straw per acre, and that everywhere horse beans were more effective than lupins. As horse beans grow here well, this is important for us. The crops near at hand which had no green manuring were complete failures, on account of drought, and it was chiefly on account of enabling the

oats, which otherwise root near the surface, to follow the passages into the subsoil left by the roots of the beans that it could draw moisture from there. Professor M. recommends now to double the quantity of horse beans and of vetches, and to sow therefore 80lbs. of each of the three, horse beans, Victoria peas, and vetches per acre.

256. *San José Scale (Aspidiotus perniciosus)*.—I extract the following from Dr. von Tubeuf's article:—"It is nearest related to *Aspidiotus nerii*. The female is up to 2mm. ($\frac{1}{16}$ in.) long, and from 1mm. to $1\frac{1}{2}$ mm. broad. It is grey, the middle of the lenticular shield is humpbacked, and of a reddish-yellow. She gives birth to living young during fully six weeks, and thus from three to five generations are noted during the year. While the young are under the shelter of the mother's shield they are of a yellowish color, have six legs, but they soon, after a few hours, or at all events within the first two days, stuck fast, secrete a kind of wax, cast their skins, and form a shield. After casting their skin a second time they form a chrysalis. are thus in one month complete, and bring forth in three to seven days living young. The male is smaller, more oval, of orange color, and has a smaller hump of a darker color. Their size is only 0.6mm. They can leave their shield and move about with their two wings and six legs, the latter of which the full-grown female has not got, and at no time any wings. The insects suck with sucking tubes, which are three times as long as their body, and, after killing the branches, the trees must die. They prefer trees with deciduous leaves. During the short time the young females have feet they manage to spread quickly over large plantations, and the more so where, in new localities, their natural enemies are absent.

257 *Kainit to Lucern*.—While Professor Maercker recommends to use 6cwts. of kainit and 2cwts. of Thomas phosphate per acre, he warns farmers not to spread it while the lucern is wet. The concentrated solution of the salt will cauterise the leaves.

The "Schnittenberger" Farm.—The following is a practical example which many might follow even in South Australia, so far as climate and rainfall will allow. Professors and teachers of agriculture and experienced farmers from all parts of Germany, Austria, Belgium, Holland, and France visit the above-named farm, sometimes as many as fifty at one time, and from the description we may at least form an idea of the so much admired alteration which a few years of rational farming and enriching the poor soil, chiefly with green manuring and mineral fertilisers, have made of an almost barren place, overrun with weeds, where, up to the appearance of the new tenant-farmer, nobody had been successful in making a living. This gentleman, Mr. L. Schickert, took a lease of the Schnittenberger Farm in September, 1883. It consists of 285 morgen (each somewhat more than half an acre), which, with the exception of 14 morgen of meadows, were mostly sandy or stony, poor in humus, or of a tough clay, while 50 morgen are even now not worth cultivation as being too stony, but must be cultivated, as they are intermixed in small portions with the better land. The position is cold, being 960ft. above the sea, the summer is generally hot and dry; rains and dews are proportionately but few. The crops previously taken from the land contained from 25 to 30 per cent. of the seeds of weeds. Ploughing and sowing being required at once, Schickert could not clean the land; but he manured with superphosphate, ammonia, and muriate of potash, and, although he also gave a topdressing of nitrate of soda in spring, the crop was very disheartening. In May, 1884, he used a paring plough and harrows on 70 morgen, a procedure which he repeated several times from ten to ten days, until he believed the weeds fairly well destroyed, and then buried them by deeper ploughing. As an experiment he manured now 6 morgen with 14cwts. of superphosphate and 5cwts. of muriate of potash, and sowed a crop of vetches, &c., for green feed. This was again a failure, and the mixed weeds fed only five head of cattle for eleven days. Schickert ascribed the failure, however, chiefly to the want of potash and lime in the soil, which allowed the phosphoric acid in the superphosphate to combine with the clay, and thus remain inactive. To further destroy weeds 35 morgen were planted with potatoes, and manured for the morgen with $1\frac{1}{2}$ cwt. of superphosphate, $\frac{1}{2}$ cwt. of muriate of potash, and 1cwt. of nitrate of soda. The land was carefully ploughed and harrowed, grass and couchgrass collected, and again harrowed before the potatoes made their appearance above ground. Later on a hoeing plough and hand hoeing completed the destruction of the weeds, and a good crop of potatoes was the result. Schickert had also been very careful in the preparation of the ground for a crop of barley, manured the land with 2cwts. of superphosphate, 70lbs. of muriate of potash, and 1cwt. of nitrate of soda per morgen, and harvested 12cwts. of barley per morgen. Oats, on the other hand, gave only 7cwts. per morgen, as he could not put the crop in early enough after manuring with superphosphate. The phosphoric acid in it being soluble in water had been sinking too deep already, and was thus lost to the crop. [Thomas phosphate would in this case have been preferable.—F.K.] The attention which he had paid to the 14 morgen of meadows was a thorough success. During the winter 1883-4 he manured with phosphoric acid and potash, used a heavy meadows harrow to open the soil for the manure and to destroy the moss. Clover and other leguminous plants made their appearance as if by magic, and gave two good cuttings. The rich humus of the meadows kept there the phosphoric acid for a longer time in a soluble state. The year 1884 had thus cost Mr. Schickert lots of money, but he saw that with hard work and manure crops

could be raised. In 1885 other 50 morgen were fallowed, like the 70 morgen of 1884, to destroy weeds; he also used more phosphoric acid and potash (for which he paid £182), and from that time, every year, 600cwts. of lime to make the cold and tough land mellow. The fallow received also the stable dung. For the barley he used, per morgen, 2cwts. superphosphate, 3cwts. of kainit, and 100lbs. to 200lbs. of nitrate of soda, and where clover was sown with it 1cwt. more of both the former; oats received 130lbs. superphosphate, 3cwts. kainit, and 130lbs. nitrate of soda; peas and other legumens 2½cwts. superphosphate and 4cwts. kainit; potatoes and turnips 1½cwt. to 2cwts. of superphosphate, 3cwts. kainit, and ½cwt. to 1½cwt. nitrate of soda per morgen. The same quantities of manure were given in 1886, and although his expenditure had been over £650 in excess of his income during the first two years, he had now the satisfaction that expense and income balanced very nearly. The attention of Mr. Schickert was now called to Thomas phosphate; he found it cheaper than superphosphate and the results about equal, after he had manured, in spring 1887, one-half of his fields with Thomas phosphate and others with superphosphate. His crop of barley, without counting the straw, not manured, realised £3 3s. per morgen, and the manured crop £7 5s. from 20¼4cwts. more. After deducting the cost of manuring, his profit was £2 10s. per morgen. In 1888, he found it still advisable to give 8cwts. of Thomas phosphate and 3cwts. to 4cwts. of kainit per morgen to clover, lucern, and sainfoin (*Onobrychis sativa*); afterwards 5cwts. of the former and 3cwts. of the latter was sufficient to give him a good profit. Up to 1896 he had thus used per morgen, on an average of the whole farm, from 40cwts. to 42cwts. Thomas phosphate and 20cwts. to 22cwts. kainit or other potash salts, so for potatoes always muriate of potash.

The supplementary pamphlet of Mr. Giersberg of this year states that manuring has been still more reduced during the last four years. Rape received now the stable dung; barley, 3cwts. Thomas phosphate and 3cwts. kainit; and with clover, 1cwt. and ½cwt. more respectively, and ½cwt. of nitrate of soda as topdressing, if needed; oats, 2cwts. of Thomas phosphate, 2cwts. kainit, and 1½cwt. nitrate of soda; legumens, 3½cwts. Thomas phosphate and the same of kainit; turnips, liquid manure, compost, 3cwts. Thomas phosphate, 3cwts. kainit, and if necessary, 1cwt. nitrate of soda (as turnips can hardly receive too much manure); maize, 4cwts. Thomas phosphate, the same of kainit, and 1cwt. nitrate of soda; the meadows, 2cwts. Thomas phosphate, 2cwts. kainit. Mr. Schickert requires, as seen from the above, but little nitrogenous manure, as he is constantly growing plants for green manuring as an intermediate crop, especially peas. He prefers since 1892 to grow barley and rye in larger fields, and no wheat, which does not pay so well. In the year 1898 he had 254 morgen out of the 285 under crop, besides 7 in fallow, and 14 morgen meadows, viz.:—84 in barley, 80 in lucern, 29 in rye, 31 in oats, 5 in rape, 5 in peas (for seed to ripen), 6 with mixed green feed, 3 in maize, 11 in potatoes, 10 in mangolds. Nearly all crops yielded of late years half as much again, and frequently almost twice as much. Barley had an average in the last three years of 16½cwts. per morgen; rye, 16½cwts.; oats, 85½cwts.; wheat, which from 1886 to 1888 had an average of 10½cwts., had in 1892 15½cwts. Lucern cut now on an average 30cwts. of hay for the first cut, and 18cwts. to 22cwts. for the second cut. This was a great surprise to all experts, the general opinion in the neighborhood having been that clover, lucern, and sainfoin could not be grown to advantage.

Mr. Schickert could soon double the number of his stock, and keeps now six horses and forty head of cattle. In consequence of the soil being now in such good heart much less seed is also required. Of rye formerly 75lbs. per morgen was sown, now 55lbs.; of barley, formerly 68lbs., now 50lbs.; of oats, formerly 60lbs., now 40lbs., or a saving of 23 per cent. If in his opinion the crops should prove too thin he prefers to give a little nitrate of soda. [These quantities seem probably to South Australian farmers still larger.—F. K.] Mr. Schickert can now grow brewers' barley after barley anywhere on the farm, and he has set 9 morgen aside to show this to visitors, and how independent the farmer may be as regards rotation of crops after his soil has become rich in plant food. After a crop of one part rye and on another part rape in 1893, he sowed in 1894, and again in 1895, brewers' barley, and obtained each year 18cwts. per morgen; in 1896 a crop of oats followed, yielding 16¼0cwts.; 1897 again barley gave 16½0cwts.; 1898 again oats, to be again followed by barley. The average of the three crops of barley must be considered as most satisfactory. Mr. Schickert has also experimental blocks on which he tries all varieties of barley, and other blocks to determine whether he can still reduce manuring, or will have better results with an increase. His success has of course had an extraordinary influence on the agriculture of a wide neighborhood. Sandy soils that could be purchased at £6 per morgen, or let at 6s., but found no customers, can now command three and four times the above prices. Clover and lucern is now cultivated, more stock can be kept, and the quantity of milk and the fat in it has increased. Stock is therefore not now considered merely a machine for producing dung; it is now a main support for the whole farm, and mineral fertilisers are now purchased without the fear of a loss after harvest.

We may learn from the above that a very poor soil can be made to yield very fine crops if properly and fully manured, so long as weeds do not smother them, lime has mellowed stiff soils, and the farmer has energy and a little capital, is practical, and yet follows up the scientific researches made of late years.

Bunt in Wheat.

Reference was made to the prevalence of smut and bunt in the crops, which Mr. Kelly attributed to carelessness in pickling and to sowing without pickling. He had never depended upon sowing dry without pickling as, if rain fell within two or three days, the spores and grain would germinate nearly together, and the crop be affected.

Mr. MILLER said it was not all the fault of the farmers. He believed much of the bunt and smut in the crops was due to the inferior bluestone sometimes sold. There was no doubt that the seed often got reinfected after pickling by spores in the sowing machines and bags. The bunt balls were not always destroyed by the pickle, and becoming crushed in the sowing machine or otherwise, the spores were liberated and reinfected the seed wheat.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Mount Remarkable, Mr. D. Roper; Crystal Brook, Mr. M. Weston; Watervale, Mr. G. Hunter; Yankalilla, Mr. J. Gardner; Holder, Mr. Morgan; Mylor, Mr. E. A. Cheeseman; Eudunda, Messrs. W. F. Krummel and C. Matzke.

Reports by Branches.

The Secretary reported receipt, since previous meeting, of forty-five reports of Branch meetings.

REPORTS BY BRANCHES.

Dawson, October 29.

Present—Messrs. C. W. Dowden (Chairman), C. F. W. Just, A. J. Hooper, C. H. Meyers, O. Müller, A. H. Warner, A. F. Dempsey (Hon. Sec.), and one visitor.

CURCULIO BEETLE—Members tabled specimens of greyish-brown beetles found on their vegetables and fruit trees. The vegetables were completely destroyed, while the leaves of the trees were stripped. The insects hide under the soil, bark, or other covering in the daytime, but are found in immense numbers early in the morning on the plants. They have been noticed on previous occasions, but never in such numbers. [Identified as *Desiantha maculata*, an indigenous Curculio beetle.—GEN. SEC.]

ROUGH WEATHER.—Mr. Just showed small sheaf of Steinwedel wheat showing effects of the rough weather, nearly half of the grain having shelled out. He had a paddock of about ten acres in a watercourse which promised two bags per acre, but quite half has gone down owing to the storm.

PAPER.—Mr. Müller read an interesting paper on his visits to the Port Adelaide Produce Depot and the Roseworthy Agricultural College; also on the proceedings of the Tenth Annual Congress. Considerable discussion followed, and the opinion was expressed that the Government could do much to help the farmers by keeping on the College Farm pure breeds of cattle and pigs, the progeny of which farmers could procure at reasonable prices for the improvement of their stock.

VELVET PEARL WHEAT.—Mr. Just said he received a small packet of Velvet Pearl or White Mexican wheat from the Bureau several years ago. He had grown this each year since, and last season had two bags. The failure then reduced this to 8lbs., which was sown, and he expected to get a nice return, while other sorts alongside, grown under similar circumstances, were almost total failures.

Nantawarra, October 21.

Present—Messrs. C. Belling (Chairman), J. W. Dall, R. Nicholls, J. Nicholls, E. J. Herbert, A. F. Herbert, R. Uppill, T. Dixon, jun. (Hon. Sec.), and over thirty visitors, including several members of Balaklava Branch.

MANURING.—The afternoon was spent in inspecting a number of the crops in the neighborhood. At the residence of the Hon. Secretary a field of wheat, drilled in with 80lbs. English super per acre, in which the binder was at work, was first noticed. Owing to the dry spell and hot winds the plant was rather short, some parts being blighted on top. It was estimated to be worth 1 ton of hay per acre. A paddock of Cape barley, also drilled, was manured with 1cwt. super guano and 1cwt. of mixture of bonedust and English super. The latter looked the better, but taking cost into consideration it was difficult to say which was the more profitable. A crop of ninety-nine acres Algerian oats looked well, and was considered worth four bags of grain or $1\frac{1}{2}$ tons hay per acre, though showing very plainly the effects of the weather. The seed was drilled in with 100lbs. English super and 20lbs. wood ashes per acre. Some very interesting experiments carried on by Mr. J. H. Frost were next inspected, English super promising better than any other manure. A splendid crop of Steinwedel wheat was seen; it had been manured with English super, and was thought to be worth four bags or 2 tons of hay per acre. A paddock of Early Para was almost as promising. At Belling Bros.' a nice crop of Steinwedel wheat, manured with 80lbs. super per acre, was seen. On a portion where the soil was stiff clay lime had been drilled in, but the results do not compare with the other. At Mr. Dall's some nice crops were inspected as well as the out-buildings, after which members adjourned for tea, the meeting of the Branch being held in the evening. Mr. Dall initiated a discussion on improved methods of farming, comparing the old system with the new. Under the old system they had managed to scrape along, but not to put by anything or allow for depreciation of working plant and stock. The use of the seed and fertiliser drills was a step in the right direction; but he would advocate caution, as, having little money to spare, they might in a bad season be in a worse position than ever if they laid out much money in fertilisers. The Chairman stated he was well satisfied with his experience with manures during past two seasons, notwithstanding the dry weather. This year he harrowed about 100 acres of his drilled crop and found the bottom much more free from weeds, while it was just as promising as that not treated. Mr. Reuter, of Balaklava Branch, stated that nine years ago he broadcasted colonial super and got 18bush. of wheat against 10bush. from unmanured. On stiff clay soils he had good results from use of gypsum from a salt lake on his place. Mr. Sires, Balaklava, stated that at the Balaklava school plots on heavy clay gypsum gave as good results as English super. Mr. J. Kelly was somewhat doubtful with their scanty rainfall and large areas, whether it was better to go in for stock and a judicious working in rotation or using manures. He was trying various manures, and though super sent the crop ahead best at first, since the dry weather set in the parts manured with bonedust and Thomas phosphate had picked up; these latter, however, were early wheats on clay soil which might give it the advantage over the part treated with super. He thought they would require 8bush. per acre yields to make manuring profitable. At Alma some wheat on land which was broadcasted in March with bonedust looked better than the drilled crops alongside. Mr. Frost said he had had fair results some years ago from broadcasting the manure, but last season he used the drill. Where he used English super he got 12bush. per acre, Thomas phosphate 6bush., and unmanured 5bush. This year he had 200 acres drilled in with English super, Thomas phosphate, and Kangaroo guano. English super looks best so far, but he could not see any difference between the

strips unmanured and the portion treated with guano. Mr. A. Robinson, Balaklava Branch, found Thomas phosphate gave better results on clay than on marly soil. On land manured with English super he got 2 tons hay per acre against half a ton without manure. He had mixed 100lbs. ashes with 80lbs. super and could see no ill effect from mixing them. Mr. R. Nicholls said from what he had seen that day he thought it would pay to drill in their crops, even with a rainfall of less than 15in. per annum. He had harrowed portion of his drilled crop, and although he did not like the look of it at first, it was now cleaner of weed, and had stood the dry weather better than that not harrowed. He found also that the drilled crops stood the wind better than those broadcasted. Mr. T. Beswitherick said he had spent £120 in seed drill and manures this season and was well satisfied with the prospects. He mostly used English super, but had tried a little Kangaroo guano, which, however, was not showing any result to warrant the expenditure. Mr. Jas. Nicholls had poor returns from drilled crop on dirty land. A very successful farmer he knew never grazed his land, but ploughed the green stuff under when fallowing. This man was very successful and generally topped the average in his neighborhood.

Renmark, October 25.

Present—Messrs. W. H. Harrison (in chair), W. H. Waters, Capt. Moffatt, S. R. Cox, M. Chapman, R. V. Bostock, E. Taylor (Hon. Sec.), and one visitor.

OFFICERS.—Mr. F. S. Wyllie tendered his resignation as Chairman and was thanked for his services. Mr. W. H. Waters was elected Vice-chairman.

LICE ON PIGS.—Mr. Cox wished to know how to get rid of lice on pigs. Mr. Waters said he had done this by sprinkling gypsum over the pigs and about the sty.

INSECT PESTS.—Mr. Chapman tabled specimen of insects found in large numbers on his block, and wished to know whether they were likely to be injurious. A visitor tabled specimen of winged insect with yellow cross on back, which were in great numbers on his orange tree, eating the young growths. To be forwarded to Central Bureau. [First specimen too immature for identification. The other is *Myctis symbolica*, or soldier bug.—GEN. SEC.]

BEE-KEEPING.—Mr. Chapman read an instructive paper on this subject.

Cradock, October 29.

Present—Messrs. J. Ramsay (Chairman), R. Solly, J. Turner, P. Gillick, B. Garnett, J. H. Iredell, J. Paterson, A. E. Clarke, J. H. Lindo (Hon. Sec.), and four visitors.

SOURSOFS.—Members reported this weed had existed in favored spots for several years, but as it had failed to spread they were of opinion that the district did not suit it and it would not become a nuisance.

DISEASES OF CATTLE.—Mr. Gillick stated that cattle affected by pleuropneumonia would sometimes travel for a long time without showing symptoms of the complaint, but when spelled for a few days it soon becomes apparent. A few years ago pleuro was very prevalent in this district, and he attributed its presence to cattle from northern disease-infested country being travelled through their district. He thought all cattle should be quarantined for three or four weeks before being allowed to enter the closer settled districts. Other members agreed. Mr. Gillick stated that cattle tick was common years ago in Ireland,

where the treatment found effective was to give 1pt. of vinegar mixed with 8ozs. of gunpowder. A member wished to know whether the meat of an animal attacked by pleuro was fit for human consumption. [No. The high fever will render the meat unfit for consumption.—GEN. SEC.]

SEED EXPERIMENTS.—Several members expressed the opinion that the seeds distributed by the Bureau for trial were intended to be exposed to the natural conditions and not watered. [Not necessarily. They should receive a little more care than the varieties of the same plants usually grown, as until they are acclimatised they may not be so well fitted to resist adverse conditions.—GEN. SEC.]

THE AGRICULTURAL BUREAU.—The Chairman read a paper on "The Bureau and its Advantages" to the following effect:—

The Agricultural Bureau has since its inception dealt with many hundreds of subjects connected with the utilisation of the land, and the squatter, the farmer, the dairyman, the fruit-grower, and the blocker have all benefited from its work. The very many practical papers read at the Bureau meetings, and the discussions thereon, have done an immense amount of good. In particular the information concerning the treatment of garden and orchard pests and of stock complaints has been appreciated by all. The members of the Central Bureau—men of acknowledged ability and authority—freely give their time and knowledge for the advancement of the producer. When the Bureau first started he thought it would soon die out, but to-day it was more alive than ever. Members of Branches when asked to write papers often say there is nothing new to write about, but there are a great many things we need to think more about and to discuss with our fellow-members. As a member of the Bureau he had no hesitation in saying that he had learnt a great deal since he joined, and expected to learn a lot more. He believed one reason of the success of the Bureau was the exclusion of politics from its scope of work. Then the officers were, of course, a great factor. To the Chairman of the Central Bureau they owed a lot; he was a well-educated man, who had read and travelled a great deal, and who was always willing to help others. He would like also to testify to the usefulness of the General Secretary. He was a man of many parts, and seemed to be able to give information on almost every subject connected with their work. He was always willing to impart information, and no one need be afraid of asking him questions. As a member of the Bureau the writer was pleased to have the opportunity of referring to the value of their General Secretary. He did not believe in waiting until a man was dead to give him just praise. There was no doubt that through the work of the Bureau the man starting to-day on the land had great advantages over those who started thirty years ago, as he has the benefit of the experiences of so many who have proved at, perhaps, great expense what can be done and what cannot.

Port Broughton, October 24.

Present—Messrs. R. W. Bawden (Chairman), J. Harford, R. Storr, E. Dalby, W. R. Whittaker, B. Excell, A. H. Dolling, S. M. Bawden (Hon. Sec.), and four visitors.

THE DRILL.—Mr. Harford read a paper upon this subject, written by Mr. F. Krichauff, Chairman of Central Bureau, as follows:—

For many centuries agriculturists have found it advantageous to distribute seeds of cereals at equal distances, and to cover them at an even depth. The former you can fairly well obtain with broadcasting machines. In China the grains of wheat are dibbled at even depth 4in. apart. The plants make from seven to nine strong stems. The result is frequently 120-fold crops from a field which has been kept absolutely free from weeds. Japanese made equidistant shallow furrows by hand, and in Persia ploughs centuries ago had leather pipes attached which deposited rice and other cereals into furrows at even depth. More than 20 years ago Signor Lana, in Italy, constructed harrows with hollow teeth for depositing seeds. Jethro Tull, nearly 200 years ago, made the first drills in England by slightly altering and improving that invented by Locatelli, a model of which he received through the Spanish Government. Tull and his followers were, however, at first of opinion that it would be sufficient to sow in the drill, and to work between the rows without using any manure. For a few years they were fairly successful, until the soil became impoverished. Thereafter the whole of the field being manured the crops were again good. Since 1793, at a meeting of the Board of Agriculture, 500 of the best farmers pronounced in favor of sowing by means of the drills, and they became soon so general in England that many old farmers do not recollect having seen any broadcasted crop. At first the distances were mostly very wide to allow of the use of a hoe, and thus not a few crops were ruined in very loose soil through loss of moisture. Subsequently the rows of seed-funnels were placed closer, and adapted for the different plants, soils, and

climate, and the hoe was only used where weeds or the nature of the soil made it desirable. In Germany the drill is now used by at least 80,000 farmers, and it was officially stated at the twenty-seventh meeting of the German agriculturists and foresters at Breslau by Director Pietrusky that it is sufficient merely to manure next to where the seed has been dropped. This was understood already by Tull "that the seeds should be drilled in on the field which had been prepared with manures as for broadcasting." To manure by means of the drill in the rows is of course better than no manure at all, and there may be some reason for it where the weeds are to be left behind in the race for supremacy and no hoeing machine is available; but if you have a drill and too much wild oats and other weeds, a hoeing machine is also required. We should not forget the words of Baron von Liebig that "the knowledge which we have of the rooting of the plants is the basis of agriculture." Do we not see that the cereals form most of the stalks where they find the greatest open space and room for their roots. Mr. Hallett actually grew fifty-two ears of from $4\frac{1}{2}$ in. to 8 in. in length from a single grain of his pedigree wheat; but it had sufficient room and nourishment. This was of course in a moist climate. Mr. Langrehr, of the Finnis Branch, had 114 stems to a plant of oats, but in drier soil and at some distance. It is quite necessary that with a view of stooling not only the rows of the drill should be wide enough apart; the grains should not be too close in the row, nor be deeper or insufficiently deep planted, as soil and climate dictate. As regards South Australia, it should be from 1 in. to 2 in. deep for our cereals. Mr. Grenfell states that at 3 in. 90 per cent. germinated. Thickly-sown cereals may stool in the earlier stages in well tilled and manured soil, but later on many of the stems must die, leaving the plant all the weaker for the attempt of forming them. No plant will rob wheat so much as another plant of wheat. The lower part of any plant is weaker if the grain is put too deep in the ground. The young plant appears later on the surface; its circle of roots near the surface also forms later, and the stooling from thence cannot so quickly proceed. In many parts of Germany the summer of 1893 was very dry, and reports from there said, that in no former year were the advantages drilled crops had over others more apparent. The grain germinated and appeared above the ground equally; the growth was subsequently symmetrical, and larger crops were the result. A drill must pay for itself through saving of seed in the first year if used on a large farm, and the experience of some South Australian farmers is not wide of that mark, especially if we consider the very high prices charged for imported drills. And this saving of seed should also be of interest to the whole community from an economic point of view, for at least 100,000 extra bushels of wheat alone are wasted by broadcasting, or worse still, in feeding a large army of sparrows when other food is scarce, the result being stronger plants further apart and permitting a draught of air, will probably withstand red rust better, give a better sample, and probably half as much more. Access of the light to the lower lower parts of the plants allows a greater assimilation of silica, which makes the straw stiff and woodlike, by which the laying of cereals may be almost prevented. Of all crops drilled in wheat gives the best results. In England the distance between the drills has generally been 8 in. to 10 in., and Dr. Hartstein mentions the average over broadcasted crops as $4\frac{1}{2}$ bush. Similar distances are advocated for Germany, but in the drier Hungary a distance of only $5\frac{1}{2}$ in. is acknowledged to be better for wheat, and $3\frac{1}{2}$ in. to 4 in. for barley and oats. We have had not sufficient experience to pronounce finally on the best distance for any locality in South Australia, but the experience of our farmers might be stated. Mr. W. Correll advocates 7 in. and 8 in., the latter for early good stooling crops. In some countries better crops of wheat are being harvested by means of hoeing the intervals with a specially-constructed machine carrying short and narrow hoes. These machines rake up from five to nineteen intervals between the rows of wheat, that is from half to three-quarters of the space between the rows. Hoeing may be of less advantage than in Europe, but in strong soils here it should be of great advantage. Our homestead settlers may find time to hand hoe their crops, especially if the surface becomes encrusted from much heavy rain. For brewers' barley the drill is especially advantageous, as, irrespective of an increase in the crop and its weight, its quality is so very good and even. Drilling of oats saves a very large quantity of seed—nearly a bushel—and the crop is better by 3 bush. to 4 bush. per acre. Peas drilled in at distances of $6\frac{1}{2}$ in., and once hoed, gave a double crop compared with broadcasted. You save seed in sowing sorghum and millet, and obtain a much larger quantity of seed. To grow carrots in the field will hardly pay without drilling. You may have with the drill up to 9 tons per acre; and from turnips you may safely calculate at one-third more than from broadcasted. Drilling in the seeds of forest trees is also adopted in Germany, and since drilling and machine-hoeing has become so general there some varieties of wheat are much cultivated that require only a few months to grow, like the Gallician summer wheat and the April or Fern wheat. Finally I mention a few advantages from drilling, which you may confirm subsequently after your attention has been drawn to them. Wheat is not so liable to lay down, or to suffer from frost; the danger from smut is much less if the grain has been covered about 2 in. deep. In that case hardly any part of the sheathing leaf, which is susceptible of being infected by the spores of smut carried about by the wind, appears above ground. At that time, as Dr. Wolff says, the young plants are so far advanced that the first green leaf shows, and the cells of the sheath are then strong enough to withstand the infection.

Mount Remarkable, October 31.

Present—Messrs. H. B. Ewens (Chairman), A. Mitchell, W. Girdham, W. Lange, G. Yates, T. P. Yates, H. Humphris, and T. Casley (Hon. Sec.).

PAPER.—A paper by the Hon. Secretary on "Manual Producers" was read and shortly discussed.

GISTING.—It was decided to consider the question of obtaining a mill for gristing to be worked on co-operative principles, the Hon. Secretary being instructed to ascertain cost and capabilities of such mills.

Paskeville, October 29.

Present—Messrs. H. F. Koch (Chairman), A. C. Wehr, T. Trebilcock, G. Bammin, A. Goodall, W. Ayles, W. Westphall, J. Bussenschutt, G. Meier, A. Bussenschutt, F. Bussenschutt, and J. H. Nankervis (Hon. Sec.).

GRUB PEST.—The General Secretary called attention to the fact that the only time action could be taken to prevent damage to crops and grass by underground grubs was when the insects appeared above ground as beetles, and notified that he had written all the Peninsula Branches urging them to take united action to destroy these beetles. He suggested that the farmers should contribute to a fund from which payment could be made for all beetles destroyed. It was resolved to take immediate steps to raise a fund as suggested by the General Secretary, a committee being appointed to arrange details. It has since been decided to pay 2s. 6d. per pound for the beetles.

FIELD TRIAL SOCIETY.—The delegates to this society reported that the majority of the Branches connected with the society favored the offer of money prizes at trials. It had been decided to offer all money prizes for strippers and binders, and first prizes in cash and second in certificates for other machinery. The next trial will be held near Kadina about end of November.

EAR-COCKLE.—The Chairman read report on ear-cockle in wheat, and urged members to take every precaution to destroy any they may find in their crops.

Port Elliot, October 29.

Present—Messrs. C. H. Hussey (Chairman), P. O. Hutchinson, E. Wood, H. Green, F. T. Fischer, J. Brown, W. E. Darwin, H. Pannell, J. Davidson, E. Hill (Hon. Sec.), and one visitor.

JAPPO.—At request of members Mr. W. Hackett explained uses of this material for pot plants and for seeds.

ICEBERG LETTUCE.—Mr. Hutchinson showed good specimens of this lettuce, raised from Bureau seed. The Hon. Secretary stated that he found this variety of good all round quality.

CODLIN MOTH.—Mr. Hutchinson read Mr. Laffer's Congress paper on this subject. Members considered Mr. Laffer's efforts to cope with this pest of a most praiseworthy character. It was thought that the Branch was quite safe in reporting this district to be free from codlin moth.

MANGOLDS.—Mr. Hackett referred to the value of mangolds, and thought much more could be done in the cultivation of this root in the southern districts.

MANURING.—Mr. Fischer directed attention to the very marked effect of manuring with kangaroo brand guano and bonedust on Mr. Brown's farm. Mr. Brown said he was so satisfied with the results from use of these manures that he would never attempt to cultivate the land without applying manure. Even for grazing he would plough up the land and manure, as the effect on the grass would be profitable.

SHOW.—It was generally considered that, notwithstanding the weather, the local show was very good. It was suggested that the members should offer a special prize for best sample of wheat grown in the district, as the general prizes for this cereal usually go to outside growers.

Port Pirie, October 25.

Present—Messrs. E. J. Hector (Chairman), T. Gambrell, G. M. Wright, W. Smith, W. K. Mallyon, and R. J. Ferry (Hon. Sec.).

FIELD TRIAL.—It was decided to unite with surrounding Branches in holding a field trial of reaping and winnowing machines.

INSECT PEST—Mr. Wright reported that insects similar to weevils were destroying the plants in his garden. Mr. Mallyon recommended sprinkling gas lime around the plants.

SEASON.—Mr. Gambrell said the fruit crop in Nelshaby would be poor. Owing to the successive droughts one member had lost over 100 fruit trees, principally apricots. Mr. Hector said his garden received several floodings during the winter, and was generally in good condition, though the apricot, peach, and plum trees were succumbing. Other trees, however, had set their fruit well. Members stated seeds from the Bureau had failed owing to the drought.

Kapunda, November 5.

Present—Messrs. W. Flavel (Chairman), J. P. Orchard, Patrick Kerin, G. Harris, J. H. Pascoe, G. Teagle, W. M. Shannon, H. King, J. A. Schultz, and T. Jeffs (Hon. Sec.).

WARTS ON COWS.—The Hon. Secretary stated he had been asked for cure for warts on cows' teats. Various remedies were suggested, including piercing the wart with a hot needle, washing with hog's oil two parts and turpentine one part, &c. [Bathe the warts in strong bluestone solution or rub with caustic. It will, of course, be necessary to wash the teats before milking.—GEN. SEC.]

CO-OPERATION.—At previous meeting Mr. J. J. O'Sullivan read a paper on this subject to the following effect:—

He had always felt a keen interest in the work of the Agricultural Bureau, and had been first in the movement to get a Branch established here, and thought the Bureau should form the starting-ground for other useful institutions. He thought a Branch of the Farmers' Co-operative Union should be found in every centre of production. Speculators and companies trading in produce and with producers' requisites reaped much more benefit than the producers themselves did. They make handsome dividends, whilst the producer gets very little for his labor. By co-operating, the producers would derive the full benefits of their industry. Many would assert that they cannot afford to take up shares in a co-operative company; but they forget that the profits made by the middle-men would cover the cost of several shares. For instance, a man selling 600 bush. of wheat would probably give the buyer 1d. per bushel profit or agency charge, but if he sold through his co-operative company, that profit or charge would go to pay for two and a half shares. In many cases the middle-man's profit may be double or treble the amount above stated. When a bulk of 1,000 bags of wheat is sold, as much as 1d. to 2d. per bushel more is often given than is offered for smaller parcels. If a branch of the Co-operative Union were established in the district, and twenty shareholders had fifty bags each to sell, they could sell the whole lot in one parcel through their own agency, and thus secure enough extra profit to pay for many shares. The same arguments would hold good with regard to wool and all other produce. The middle-men rely upon the want of unity amongst the producers, and say they will never be induced to combine. He (Mr. Sullivan) advised producers to prove the contrary. Let them form committees in every district, and see what can be done towards establishing Branches of the Co-operative Farmers' Union. The chairman and directors should consist of men of the best business capacity. The Union should not only act as an agency for the disposal of produce, but should also purchase all supplies and requisites for producers at wholesale prices, and distribute at lowest profit charges to its shareholders. He hoped that every Branch of the Agricultural Bureau would seriously consider this matter.

Stockport, November 5.

Present—Messrs. T. Megaw (Chairman), C. W. Smith, C. F. Jorgensen, S. Smith, M. Connolly, F. Watts, J. Smith, sen., W. Barker, D. G. Stribling, T. Howard, S. Rodgers, J. Murray (Hon. Sec.), and eleven visitors.

SOURSOPS.—Most members reported having a good supply of this weed. Mr. C. W. Smith said an old garden formerly covered with this weed was now overrun with native clover, there being no soursops noticeable. Mr. J. Smith said he tried salt without killing the weed, also covering with bags, which kept it down for a while, but as the bags rotted the soursops grew through: but not so thickly as before. He had dug up some plants with roots a foot in length and covered with bulbs, large near the surface and smaller as the root went down, those at the bottom being about the size of wheat grains. Mr. S. Smith stated that five or six years ago he started a garden on a thickly-infested patch of ground, and by continued working had almost got rid of it. Mr. Jorgensen thought the best way to get rid of the weed would be to let the land lie out and heavily stock with sheep.

CONGRESS.—Delegates to Congress reported on proceedings of same.

Tatiara, October 1.

Present—Messrs. G. Ferguson (Chairman), J. Rankine, E. Prescott, Thos. Hall, R. Scown, C. H. W. Wiese, F. Smith, G. Milne, Thos. Stanton, and W. E. Fisher (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year twelve meetings were held, the average attendance being seven, one better than the previous year, but not so good as it should be. The South-Eastern Conference of Branches was held in the district for the first time, and was a distinct success. The question of manuring has received considerable attention, and there has been a great advance in the area manured and sown by means of the drill. Stock complaints have also been prominent, and valuable information has been elicited on these matters. During the year four papers have been read and discussed. Mr. Thomas Stanton was elected Chairman and Mr. W. E. Fisher re-elected Hon. Secretary for ensuing year.

CONGRESS.—Mr. Ferguson reported on proceedings of Congress, and referred specially to Professor Lowrie's address on agricultural shows. He thought one show would scarcely be enough for the North, but otherwise generally agreed with the professor. It was decided to discuss the matter at another meeting. Some discussion took place on the visit to the Agricultural College. Members thought that if the visit at show time was confined to country farmers there would not be any overcrowding of conveyances, &c., by young men from the city, who, if they desired to inspect the college, could go at some other time.

DRAUGHT HORSE.—Mr. Hall read a paper on "Which Kind of Draught Horse is most Suitable for this District," to the following effect:—

On this subject there will of course be considerable difference of opinion. Many prefer the heavy hairy legged horses, while others speak up for quick active horses. By watching the teams coming into the railway station with produce a good idea may be formed of the stamp each farmer favors. Personally, if he could get them, he would use nothing but a short, square, low-set horse—a big horse in a small compass. If well bred these will, in his opinion, prove the most serviceable. They require less feed than the heavier horses, will stand as much if not more work, and look better at the end of the season; they are more active, and do not tire so soon in heavy moist land. A horse that is capable of pulling 20cwt. to 25cwt. on the natural roads in summer time was required. He did not approve of them being too light. To obtain such horses they must exercise care and judgment in breeding. A close-set stallion put to a good roomy mare should produce the required animal. For lighter horses, for harrowing and other light work, put good draught mares to a pure blood stallion,

Mr. Milne believed in light draught horses. Heavy hairy-legged horses get dirty, especially in muddy weather, and do not stand so well as the medium horse. He would put good heavy mares to a blood stallion. Mr. Wiese said he was sure such horses would not be able to work his heavy land. Mr. Prescott would not care to breed with a heavy mare and blood stallion. Mr. Hall said he bred the horse that took the prize three times at Bordertown from such horses. Mr. Ferguson considered hairy-legged horses unsuitable; he believed in a good upstanding horse for farm work. Their horses generally were weedy. Mr. Rankine favored the Cleveland; the lighter the horse, provided he has the power, the more work can be got out of him. He thought the stallion should be bigger than the mare. In reply to questions as to a fair day's work for a team of three horses with a double-furrow plough, Mr. Milne said two acres, while Messrs. Rankine and Wiese thought two and a half acres little enough as an average, but much depended on the land.

Crystal Brook, October 29.

Present—Messrs. G. Davidson (Chairman), W. J. Venning, J. C. Symons, R. Pavy, W. Natt, W. Hamlyn, A. Ferguson, W. Morrish, and G. Miell (Hon. Sec.).

FIELD TRIAL.—Owing to earliness of the season, it was decided not to hold the proposed trial of harvesting machinery.

WHEATS.—Considerable discussion took place on the manner in which the various wheats stood the dry season, and upon the use of manures. Very little wheat having been reaped, no definite results could be given.

Davenport, October 28.

Present—Messrs. W. J. Trembath (Chairman), R. Fawcett, W. Hodshon, J. Holdsworth, W. Penna, and J. Roberts (Hon. Sec.).

DAIRYING.—It was decided to ask the Minister of Agriculture to allot to the Branch one of the Jersey bulls belonging to the department.

INSECT PEST.—Members reported that a small brown beetle had been doing much damage to beans, tomatoes, &c., eating the plants just at the surface.

DISCUSSION.—Considerable discussion took place on various matters connected with the blockers' interests. Mr. Holdsworth tabled samples of Kohlrabi and red beet.

Arden Vale, October 31.

Present—Messrs. A. Hannemann (Chairman), M. Eckert, M. Searle, D. Liebich, L. Warren, A. W. Fricker, P. Starr, C. Pearce, G. Miller, and E. H. Warren (Hon. Sec.).

CONGRESS.—Mr. Searle reported on the proceedings of Congress and the Adelaide Show, both of which he considered educational. In regard to Professor Lowrie's address on agricultural shows, he agreed that there were too many shows, but considered three shows, as advocated by the professor, too drastic. It was decided to discuss the question at a future meeting.

CO-OPERATION.—A short discussion took place on the progress of the Farmers' Co-operative Union, the arrangement with the Manchester Co-operative Company meeting with approval.

ANNUAL MEETING.—This being the annual meeting, further business was postponed on account of the usual concert, which was well attended.

Watervale, October 31.

Present—Messrs. C. A. Sobels (Chairman), J. Thomas, E. W. Castine, H. Croft, L. Buring, W. Smith, E. Treloar, and E. E. Sobels (Hon. Sec.)

SEASON.—Members reported that the late hail and wind squalls had seriously damaged the fruit crops. In some cases half the grapes have been knocked off the vines, and the cherry crop completely spoiled. The young apples are badly pitted with the hail, and will not be fit for export purposes. Other varieties of fruit not so injured, but apricots and peaches have been affected by shothole and curl leaf. The wheat has benefited considerably from the rain, though somewhat knocked about.

WEEDS.—Mr. Croft asked how it was that sheep manure always produced a crop of nettles, even when, as far as could be seen, the sheep never came in contact with the plant previously. Members were of opinion that the sheep had picked up the seed by some means or other, and so distributed them about the sheep yards. Hosing the plants before they seed was the best means of getting rid of the weed.

Hawker, November 2.

Present—Messrs. A. C. Hirsch (Chairman), T. Laidlaw, H. M. Borgas, W. J. Schuppan, S. Irvine, C W Pumpa, and J. Smith (Hon. Sec.).

BINDER TWINE IN HAY.—The Chairman said this matter was brought before Congress, but little interest was taken in the matter, and there appeared no chance of anything being done. Members were of opinion that the only way to prevent twine being cut up with the chaff was for the purchasers to boycott those who adhere to the practice, and to make widely known the injurious effect the twine has on stock constantly fed on chaff containing same.

CERFALS.—The Chairman reported that in 1897 a friend of his planted a mustardtinf of Beardless barley and reaped 28lbs of grain. This was sown again, and he expected to have enough grain to sow at least two acres next year. Mr. Irvine referred to experiments with Allora wheat. He considered it an improvement on Steinwedel, being quite as early and less likely to shake out; but Mr. Schuppan thought it no better than Steinwedel in this direction. The Chairman considered the early wheats best for this district, and thought they would do well to experiment with such wheats with a view to finding out which was most suitable. Mr. Laidlaw found Smart's Purple Straw a good wheat for this district. The members were of opinion that the severe frost and hot winds had more to do with the failure of their crops than absence of moisture.

HARROWING GROWING CROPS.—The Chairman stated that he had noticed that where the crops had been harrowed after the wheat was up they were standing the dry weather better than others. Mr. Borgas had noticed the same thing, especially with drilled crops. and has also noticed that the drilled wheat stood up better than broadcasted wheat in windy weather.

Forster, October 31.

Present—Messrs. A. Johns (Chairman), C. Bolt, J. Sears, J. Retallack, J. D. Prosser, A. Retallack, J. R. Bolt, F. Towill, W. H. Bennett (Hon. Sec.), and eight visitors.

SEED EXPERIMENTS.—Mr. J. Sears reported that the Quality pea was about the best he had ever seen. He did not care for Quantity pea. Mr. Prosser said from nine seeds of the latter pea he got back 311 seeds; from nine of

Laxton's Evolution, 120; and from eight plants of Quality pea 224 seeds were secured. White Monarch wheat was doing well, being 3ft. high, nicely stooled, and well headed. Golden Return was 3ft. high, heads good, but had fallen slightly. Dart's Imperial wheat was 3ft. high and doing well. Mr. J. Sears said his Golden Return wheat was well out in ear, and promising well. The Chairman had Golden Return wheat 2ft. 6in. high, and Dart's Imperial 3ft., both looking well. White Monarch wheat had all burnt off.

HAY.—A discussion took place on cutting for hay. Mr. J. Sears thought they should get their fields in better trim, and use the binder, doing away with the horse rake, and getting cleaner hay. They would be able to handle the bound stuff in windy weather this being a great advantage. Mr. C. Bolt did not think the binder would do in their rough land, and believed the side-delivery mower would be best. The majority of members agreed. Mr. J. Retallack said he would leave his crop until the grain was full before cutting for hay.

MIXED FARMING.—Mr. F. Towell read a short paper on "Making a Living on Old Farms." He would depend very largely on the by-products, putting in a small area of wheat on fallowed land. Keep a good number of poultry of mixed breeds, rearing all chicks, hatching them not later than October (to get winter layers), and keeping none after they reach the age of three years. He would also keep a few good cows, getting them to calve in April, and would feed them to a large extent on wheat, chaff, and bran. To lessen expenses he would produce, as nearly as possible, everything consumed by the family.

RABBIT TRAP.—Mr. J. Sears showed model of rabbit trap which had been used with considerable success in the district.

Tatiara, October 21.

Present.—Messrs. T. Stanton (Chairman), G. Ferguson, R. Scown, E. Prescott, G. Milne, Thomas Hall, W. E. Fisher (Hon. Sec.), and three visitors.

Shows.—A short discussion took place on agricultural shows in special reference to breed of horses, and it was decided to discuss the matter at a future meeting, when Mr. Prescott will read a paper on the subject.

HARVESTING MACHINERY.—Mr. Ferguson read a paper on this subject, of which the following is an abstract:—

He first compared the present method of harvesting with stripper, twine binder, and steam thrasher with the old system of cutting hay by means of sickle or scythe, and thrashing with flails or by means of bullocks; then cleaning by aid of the wind in the long-elevated riddle worked by a lever. There was no doubt the introduction of the stripper made wheat-growing in South Australia profitable, and although these machines had been greatly improved, the introduction of the string binder and steam thrasher was another great advance. There are many farmers who say this latter method of harvesting their wheat crops will not pay, and years ago there was no stronger advocate of the stripper than himself. His experience since had, however, shown him conclusively that it was more profitable to use both the binder and the stripper than the latter only. To make the most of your crops both machines are necessary. Cut the good crop with the binder, and strip the poorer. There is too much risk in leaving a heavy crop to ripen for the stripper. It should be cut and stooled before this time, and would then be out of ordinary danger, as any weather that would harm it when properly stooled would ruin a standing crop. It often happens that between the time the crop is fit to cut with the binder and the time the stripper could be used a hot windy day will knock several bushels per acre out of a good crop, while rain and wind would beat it down so that only a small proportion of the grain is obtained by the stripper. One advantage of the binder is that you can work from daylight to dark, even after a damp night, and where two teams are available a large area can be cut daily, whereas the stripper cannot be used till the sun has warmed up things, and has to be stopped sooner. The great points in favor of the use of the binder is in getting the crop off before it is thoroughly ripe, and the saving of straw. To those who think the risk run by leaving their heavy crops to ripen for the stripper rather than go to the extra expense he would say try the experiment with fifty to eighty acres of the best of the crop.

They would then have a good stack of wheaten straw which, when chaffed and fed with equal quantities of hay chaff to prevent scouring, will be of great value to them. Oaten straw chaff does not cause scouring, but he considered it better to cut it up with hay for feeding. The stock that have a straw stack to feed and shelter at in the winter do better and are more contented than those which have to go without. With dairy cattle in particular the advantage is very great, as they are in full profit as soon as they come in, whereas the others do not get into condition until perhaps a third of the season is past. Then, in a bad season a good stack of straw will keep your stock alive. Since he had his first stack of straw he had never been without a stack, and he hoped he never would be. He had noticed that a member of the Strathalbyn Branch put down his loss in carting the sheaves of barley to 2bush. per acre. He simply could not credit this, as once it is cut and stooked there should, with careful treatment, be no loss, unless you have a bad thrashing machine. In regard to extra expense of harvesting with the binder and threshing, Mr. John Sloane, of Inglewood, Victoria, told him that after paying for all the labor he employed, and allowing 10s. per ton for the wheat straw, it does not on an average cost him more than 3s. per acre above what stripping cost. As he has two strippers and two binders at work when harvesting, these figures are reliable. In his own case he had never gone into the actual figures, but if, when the thrashing machine left his farm, he was offered in exchange for the straw, cavings, and wheat chaff the expense for twine, wages, and thrashing, he would certainly refuse; in fact, he would not accept double the expense.

Mr. Milne said, after five or six years' experience, he found that $\frac{1}{2}$ bush. per acre was the most anyone using ordinary care should lose. This was allowing for the grain left in by the thrasher as well as loss in handling sheaves. He certainly agreed with Mr. Ferguson that the binder should be used in the heavier crops and the stripper on the rest. In this district they could commence ten days earlier with the binder than with the stripper. He would always cut oats with the binder. Other members agreed with this. Mr. Prescott strongly advocated the use of the binder. Not only was the straw very valuable, but less grain was cracked in the thrasher than with the stripper. At the commencement of lambing he had a large stack of oaten straw, so he yarded the ewes against this every night, providing not only food, but shelter. They ate a very large quantity of the straw, and he never before had such fine lambs. He would be very sorry to be without his stack of straw, which he reckoned did not cost 25 per cent. of its value to save. The sheep feeding on this return to the land some portion of the nitrogen taken out by the crop; but, if burnt after the stripper this is lost, besides which the ashes, too, are generally blown away. In reply to question, Mr. Prescott said he found the wool of his sheep was not damaged by seeds from the stack though they eat right into it.

VISIT TO HOMESTEADS.—This meeting was held at Mr. Ferguson's residence, and after conclusion of the meeting members inspected the crops and garden. Some early sown crops were very promising, but the very late sown ones are not likely to yield much. The garden looked exceedingly well, the fruit trees being healthy and well loaded. The apricots were carrying a very heavy crop, and promise to mature well if left alone by the birds.

Morgan, October 28.

Present—Messrs C. F. W. Fitzner (Chairman), R. Windebank, A. Stubing, E. French, T. T. Schell, G. Roediger, and J. Wishart (Hon. Sec.).

DEEP AND SHALLOW PLOUGHING.—Mr. Stubing initiated a discussion on subject. His experience in this district was decidedly in favor of shallow cultivation. Members defined shallow ploughing as applied to the district to mean not more than 3 $\frac{1}{2}$ in. deep, while over 4in. would be deep ploughing. The majority agree that the more soil was turned up the more rain required, and, as the rainfall here was very light, deep cultivation was not suitable.

Holder, October 29.

Present—Messrs. F. A. Grant (Chairman), J. Maddocks, F. Rogers, F. Slater, P. J. Brougham, H. Blizard, W. Watt, J. E. Trimming, and J. J. Odgers (Hon. Sec.)

SEED EXPERIMENTS.—Mr. Slater reported that his plot of Laxton's Evolution pea was nipped by the frosts, but recovered, and was now bearing a good crop, the pods being large and well filled. The plants were 4ft. high and still growing. Mr. Blizard stated that for some time the Mackay pea set no pods, but lately they have set freely, being small but well filled.

Boothby, November 1.

Present—Messrs. J. T. Whyte (Chairman), T. Sims, H. G. Evans, J. Bell, J. R. Way, F. Mills, and J. A. Foulds, (Hon. Sec.).

EARLY WHEATS.—A discussion took place on this subject. Members were of opinion that early wheats were much the best for this district. Steinwedel up to fifty acres per machine was generally favored. Bearded wheat was also good, but only a limited quantity should be sown. 'Twenty Weeks' wheat was also suitable, but lays down too much.

Richman's Creek, October 31.

Present—Messrs. W. Frebairn (Chairman), J. J. Searle, E. Roberts, A. Knauerhase, A. Nicholson, P. J. O'Donohue, J. M. Kelly, J. McSkimming, J. J. Gebert, J. McColl (Hon. Sec.), and two visitors.

WHEAT FLOORS.—The Hon. Sec. read the following paper :—

This subject, although only of minor importance on the farm, is one, I think, that is worthy of a little more attention than it receives. There may be a difference of opinion as to the kind of preparation required, as some when reaping simply choose the most convenient spot on the stubble land on which to empty the machine. While this method may have its advantages, yet in the practice of it to any extent I cannot see how a waste of grain can be avoided, and should prefer marking off the floors before the paddock is ploughed, say about a chain in from the headland, where the lands are not too long to fill the reaper in one round on a 15bush crop; otherwise the middle of the land would be the most convenient if a level spot can be found. Then in a good crop the machine could be emptied twice in a round, or once in a light one. Having marked off the place, all stones and rubbish should be cleared off, and where convenient a thin coating of old chaff might be left on the floor until the following season, removing it about hay time; this would tend to improve the surface. It would be wise to plough round the floors after the hay has been removed; it will not only act as a safeguard against fires, but may prevent flood waters from damaging the heap. We have found it a good plan when reaping to cave the rough chaff off the heap and spread it on the floor where the machine is to empty, and it not only keeps the floor from cutting up with the wheels, but forms a good bottom for the heap, keeping the grain from the ground, and there is less waste when cleaning up. I have known of cases where a loss on market price of from 1d. to 2d. per bushel has been sustained owing to the presence of small stones and pieces of earth in the sample, through carelessness in mixing the sweepings with the heap when winnowing. In these times of small crops and low prices we cannot afford even a small loss from preventable causes. My object in giving expression to these few thoughts is to promote discussion in the hope that we may gain some practical hint from each other's experience.

The Chairman seldom left any floors, but emptied the machine where most convenient, and lost but little grain from doing so. He thought the land that would have to be left bare for floors would return more than enough to repay the small loss sustained at present. Mr. Roberts had saved the best places for floors, but had not always used them, because sometimes there was nothing near them to reap, and he had to make the heap where most convenient. Mr. McSkimming always left floors when ploughing, and would rather make the heap on a hard floor than on stubble. Mr. Knauerhase agreed, and thought

some chaff left on it would improve it. Mr. O'Donohue said he left floors where most convenient, and never liked the harrows to go over them. He did not like the idea of emptying the machine on the stubble, as it was difficult to keep the dirt out. If the land was well rolled there might not be this objection. The heaps should not be too large, as they were more difficult to clean up, especially if the wind is changeable.

FLIES ON HORSES.—Mr. O'Donohue said the flies were again becoming very troublesome to the horses' eyes, and asked if there was any simple way of preventing this trouble. Mr. Gebert found the best thing was to plait the brush of a cow's tail on to the horse's forelock, when the least movement of the head would keep the flies off. Members thought hair from the horses' tails would answer the same purpose. It was generally acknowledged that during the summer the flies were real torture to the animals, and any simple effective remedy will be greatly appreciated by all stockowners.

GRASSHOPPERS AND BIRDS.—Members reported having noticed crows, magpies, and even the despised sparrows feasting on grasshoppers recently.

Colton, November 5.

Present—Messrs. P. P. Kenny (Chairman), W. A. Barnes, A. S. Bartlett, M. S. W. Kenny, W. L. Brown, A. A. Stephens, W. McElder, and R. Hull (Hon. Sec.).

VINE HAWK MOTH.—Mr. Bartlett showed caterpillars of vine hawk moth found in his garden.

EARLY WHEATS.—Mr. Stephens showed samples of King's Early Wheat, and a discussion ensued on the best wheat to grow for this district. No decision was arrived at, as results in different years vary to such an extent. Steinwedel was considered to be specially erratic in this respect, and ripens very unevenly some seasons. Mr. Barnes said his experience was that the large-berried wheats were the most liable to bunt. It was decided to make inquiries *re* change of seed.

MOWING MACHINES.—Mr. Barnes said he found it made considerable difference in the cutting capabilities of mowing machines if the fingers as well as the knives could be kept sharp. The Hon. Secretary said he had tried to sharpen the fingers of his machine, using a good new file for the purpose, but could make no impression, the fingers being like glass.

Elbow Hill (Franklin Harbor), November 2.

Present—Messrs. E. Wake (Chairman), C. G. Ward, D. McKenzie, H. Dunn, T. Story, W. Spence, J. Spence, J. Harvey, J. Foulds, W. Ward, H. T. Styles, J. Elleway, W. Beincke, G. Wheeler (Hon. Sec.), and six visitors.

CEREAL EXPERIMENTS.—The Chairman tabled several varieties of wheat and oats from Bureau seeds, one kind being especially admired by members. [This report would have been of value to others had the names of the varieties been stated. All seeds sent out for trial should be grown under their proper names, and a record of same kept.—GEN. SEC.]

SHEEP.—Mr. McKenzie initiated a discussion on sheep for farmers. He had no doubt that when wheat is high in price it was more profitable, but generally it will pay to keep sheep, as they are more reliable. On an average farm of 2,000 acres here 300 sheep can be well kept. The farmer should start with about 150 full-mouth ewes, which he could obtain at about 5s. each. With average luck he should get at least 80 per cent. of lambs. When the

flock is brought up to 300 the annual increase will provide the farmer with meat for his family and 100 sheep to sell each year, which, at 3s. per head and the wool from the flock, will bring in a nice addition to his income. Every farmer should keep enough sheep to provide meat for his family. A farmer in this district received £40 this year for the clip from 250 sheep. Seven hundred acres after cultivation should keep 300 sheep. In the hills here the land was not much good unless sheep are kept. Care must be taken not to overstock or to feed down too closely. The drawback to keeping sheep was the existence of vermin, both rabbits and dogs being a source of trouble. Mr. Beincke stated that he received £18 for the wool from 130 sheep this year. The Chairman agreed with Mr. McKenzie. Sheep would not pay running at large, and the farmer who could pay to shepherd would find it would overcome the dog trouble. If the Government would subsidise the amount paid for scalps the trouble would soon be a thing of the past. During the past two years he had lost 150 sheep from the ravages of dogs, notwithstanding which his sheep had paid him well.

Brinkworth, November 11.

Present—Messrs. R. Cooper (Chairman), J. F. Everett, G. Freebairn, C. Ottens, W. H. Pearce, H. Bastian, A. L. McEwin, W. Wundke, J. Stott (Hon. Sec.), and one visitor.

SEED EXPERIMENTS.—At previous meeting Mr. A. W. Morrison sent samples of Mammoth, Clyde, and Monarch turnips from Bureau seed. Considering the season these had made good growth, and he was favorably impressed with them. Messrs. Cooper and Wundke report that the oats from Central Bureau [What varieties?—GEN SEC.] would be very suitable for hay, but not profitable for grain, the straw being too thick to strip by the ordinary stripper.

GOVERNMENT BULLS.—It was decided to ask the Minister of Agriculture to allot to this Branch one of the bulls purchased by the department, when shifted from their present stations in January.

Mount Pleasant, November 11.

Present—Messrs. G. Phillis (Chairman), F. Thomson, P. Miller, jun., J. Maxwell, J. A. Naismith, A. Baker, and H. T. Hull (Hon. Sec.).

STOCK COMPLAINTS.—Attention was drawn to the frequent losses in this district of mares when foaling. Members wished to know whether anything could be done to prevent this trouble beyond close watching and assisting the mares.

MILK FEVER.—It was stated that a stockbreeder in the locality had successfully treated cows for milk fever by giving half a bottle of whisky in water, repeating the dose within an hour.

Meadows, November 7.

Present—Messrs. J. Catt (Chairman), T. Grigg, T. Brooks, G. Ellis, G. Rice, W. Pearson, W. J. Stone, W. A. Sunman (Hon. Sec.), and two visitors.

ENSILAGE.—A discussion on this subject took place. Mr. Grigg stated he had had new pits built of concrete, one part of lime to five parts gravel being used, and these cemented. He puts in one or two loads of green fodder at a time and allows the stuff to heat up before putting in more. Messrs. Pearson and Stone preferred to fill up their pits as quickly as possible and then put on

weight, 200lbs. to the square foot. Members wished to know whether lucern hay would not be as good for milk production as ensilage. [Probably not. An acre of green feed made into hay will not go nearly so far in feeding cows as it would when made into ensilage. Four tons of green stuff will make about 1 ton of hay or $3\frac{1}{2}$ tons of ensilage. One ton of hay will feed a cow for five or six weeks; the $3\frac{1}{2}$ tons of ensilage would feed the same cow for about twenty weeks.—GEN. SEC.]

Calca, November 5.

Present—Messrs. James Bowman (in chair), A. Plush, W. Wilcott, R. H. Squire, T. P. Cash, D. P. Thomas (Hon. Sec.), and four visitors.

PLOUGHING AND SOWING. — Mr. Plush read a paper on this subject, to the following effect:—

Ploughing should be finished as early as possible in order to get the land sown early. Sowing in this district should be finished by the middle of May. June was too late for the West Coast. Early wheats are best. This season they had a good illustration of the benefits of early sowing. The early-sown wheats were all well out in ear, while the late sown are just coming out; the self-sown crops being nearly ripe. The spring here becomes hot and dry too early for the late crops. He believed in thin sowing. He had never sown more than $\frac{1}{2}$ bush. per acre. This was quite thick enough, for if there is plenty of rain there will be a good crop; while if the season is dry a thin crop stands better than a thick one, for in the latter the strong plants will either grow away from and destroy the weak ones or the whole will grow up weak and spindly with poor ears. He was in favor of deep ploughing, as they would generally get better results than from shallow. Three years ago he shifted a fence back a little and the strip about 1ft. wide along the old fence line was quite 6in. higher than on either side. This he attributed to the fact that the line had been dug out 6in. deep to admit the wire-netting when erecting the fence, the field being ploughed to depth of 4in. Another advantage of ploughing deeper was that more of the mallee roots were torn up, weakening the growth of the shoots.

THIN SHELL EGGS.—Mr. Wilcott wished to know cause of fowls laying thin and soft shell eggs, and how to prevent the trouble. [Put a little lime in the drinking water and put some pure bonedust in their feed.—GEN. SEC.]

MANURES.—Mr. Wilcott reported that his crop of Nonpareil wheat, on land manured with Thomas phosphate, was completely blighted; straw, ear, and all being quite white.

Meningie, November 12.

INAUGURAL MEETING.

Present—Messrs. M. Linn, J. Williams, R. M. Scott, H. B. Hackett, T. W. R. Hiscock, C. J. Shipway, A. Linn, W. Tiller, and W. J. Botten.

OFFICERS.—The following officers were elected:—Chairman, Mr. M. Linn; Vice-Chairman, Mr. J. Williams; Hon. Sec., Mr. H. B. Hackett.

BUSINESS.—Suggested rules as received from Central Bureau were adopted as the rules of this Branch. It was agreed that members submit items of useful information to Hon. Secretary for discussion at next meeting. Other formal business was transacted.

Cherry Gardens, November 8.

Present—Messrs. E. Wright (Chairman), T. Jacobs, C. Lewis, J. Mackeith, G. Metcalf, J. Choate, J. Nicolls, C. Ricks (Hon. Sec.), and one visitor.

FRUIT-GROWING.—Members reported considerable damage to fruit crop by hail and wind storms. A discussion on the protection of native birds took place. Mr. Jacobs stated that he had seen the common "Wag-tail" fluttering about the branches of a fruit tree and catching any moths that he disturbed.

Dowlingville, November 2.

Present—Messrs. R. A. Montgomery (Chairman), J. Phelps, G. Mason, T. Illman, J. Burkin, F. Roberts, R. Foggo, J. L. Broadbent (Hon. Sec.), and two visitors.

UNDERGROUND GRUBS.—Considerable discussion took place on the ravages of various kinds of underground grubs and beetles. Mr. Phelps stated that some time ago one kind destroyed his crop, eating the newly-sown grain or the young plants, and he had to re-sow. Mr. Foggo suggested drilling in poison with the seed, mixing it with bran or other substance. Members were not acquainted with the beetle of the grub which destroyed the plant underground, and the question was raised as to whether it had been known in the south of the Peninsula previous to last year. The Chairman stated that there was one kind that had a hole in the ground, and after nipping off the blades of the plant carried them to his nest, which was webbed in. He had seen thousands of these.

BUNT.—A member reported this to be very bad, and attributed it to the seed drills, as the grain was well pickled. Members thought that the bunt balls got broken in the drill, and so re-infected the grain. It was noticed that in one case in one line of the drill the plant was worse than in any others.

AGRICULTURAL SHOWS.—Professor Lowrie's paper on this subject was discussed. Mr. Foggo strongly advocated trials of implements every three years, and also approved of the professor's idea of large prizes for stallions. Considerable difference of opinion existed in regard to the professor's suggestions, but the idea of giving implements an extended trial met with favor.

Bowhill, November 5.

Present—Messrs. J. G. Whitfield (Chairman), W. Towill, C. Drogemuller, E. Weyland, J. Waters, J. F. A. Dohnt, W. G. F. Plummer, and H. H. Plummer (Hon. Sec.).

CEREAL EXPERIMENTS.—Mr. Towill stated that he could see no difference between Gravestock's Frampton and Steinwedel wheats. Messrs. Drogemuller and Dohnt said these wheats were like one another, but the former was a little lighter in color and did not shake out. The Hon. Secretary reported that out of twenty-one varieties he was testing. Steinlee, a cross between King's Jubilee and Steinwedel, was far the best, and worth trying on a large scale. Mr. Dohnt found Petatz Surprise stood the dry season well and promised to yield well.

ONIONS.—The Hon. Secretary showed two onions illustrating the effect of deep and shallow planting. The one planted shallow had a nicely-formed bulb, while the other was almost straight from the root. Mr. Drogemuller said his experience was similar.

HINTS TO FARMERS.—Mr. Waters read the following paper on this subject:—

The homestead should be built on rising ground as near the middle of the farm as possible. The stables should be a convenient distance from the house, about fifty yards, and be so built that the animals can be fed from the head; the cow bails should be under cover and near the stables so that waste hay can be given them without much trouble. The implement shed should be 50yds. or 60yds. from the other buildings, so that if one shed should catch fire the others may be saved. The machinery should be cleared from all oil and grease and put away in the sheds, instead of being left in the field exposed to the weather. A coat of paint every three years improves the look and makes the machinery last longer. The harness should be kept clean and given a coat of neatsfoot oil twice a year. It should be hung upon pegs when not in use. Farmers should keep a collection of copper rivets, a little wax, a ball or two of good hemp, and a few good pieces of leather for mending harness. A handy man can save a good many shillings in this way. He should also have a blacksmith's shop of his own

where, during wet weather, he can mend broken chains, make eye bolts, hooks, &c., shoe his horses, sharpen his crowbars, picks, &c. Every farmer should have a garden and grow fruit and vegetables for himself. I would advise every land owner to erect the best fence between his land and his next door neighbour's, as they all know that "bad fences make bad neighbours." A good fence may be put up as follows:—Posts, 5ft. 3in. long, sunk 20in. in the ground, with a barbed wire on top, a plain wire 10in. below, and another barbed wire 10in. below the plain wire.

Members generally agreed with Mr. Waters' remarks, and considered more attention should be given to the arrangement of sheds and stables, and the necessity for good fences, &c. Mr. Whitfield said he found that the saving effected by repairing his harness himself and doing small blacksmithing jobs was considerable. The saving in the latter alone was sufficient to pay for forge, bellows, and tools in eighteen months.

CONGRESS AND COLLEGE.—Mr. W. G. F. Plummer reported on proceedings of recent Congress and on visit to the Roseworthy College, from both of which he had benefited. He gave information concerning the details of the stables, sheds, etc., at the College, and considered it absurd for farmers to say they could not arrange things in a similar way. It could not, of course, all be done at once, but they could do little by little. He was at least determined to try to adopt the plan for himself. In regard to the seed and manure drill, he was convinced that no farmer should be without one.

Murray Bridge, November 12.

Present—Messrs. F. H. Wurm (Chairman), W. Lehmann, J. H. Thiele, J. J. Stecker, Herman Schubert, W. Schubert, Heinrich Schubert, J. G. Jaensch, B. Jaensch, H. Block, J. Cowan, W. F. Wundersitz, T. Heinrich, R. Edwards (Hon. Sec.), and one visitor.

FRUIT PESTS.—Mr. W. Schubert tabled branch of peach tree attacked by some insects, and wished to know whether illustrations of the various insect pests were to be published in the *Journal*. [At present this work cannot be undertaken.—GEN. SEC.] It was suggested that the Inspector of Fruit should be invited to give an illustrated lecture on insect pests.

EXHIBITS.—Mr. J. Opie showed samples of grasses from Wow Wow Plains. Mr. Herman Schubert tabled stalks of wheat with two heads on each.

MANURING.—Mr. Heinrich Schubert exhibited two sheaves of wheat, each cut from 1 sq. yard of land. One was 3ft. high, and weighed 3½lbs; the other being only 12ins. high, and weighing 3½ozs. The first was from plot drilled in with super and the second drilled in without manure.

SPARROWS.—The Chairman referred to the rapid increase of sparrows in the district, and suggested that the Branch should endeavor to raise a fund from amongst the farmers, to be subsidised by the local council, from which payment could be made for sparrows eggs and heads.

Mount Gambier, November 9.

Present—Messrs. J. Umpherston (Chairman), W. Mitchell, W. Barrows, J. Dyke, J. C. Ruwoldt, M. C. Wilson, T. H. Williams, J. Watson, and E. Lewis (Hon. Sec.).

VISIT TO FARMS.—The members visited the following farms:—

Mr. J. Dyke's Farm.—This member gives his attention chiefly to dairying, milking at present thirty-five cows; but later on will have a good many more, as they come in. His herd is mixed, but he has introduced a good deal of Jersey strain, which has improved the quality of the milk, which averages over 4 per cent. of butter fats. One cow gave 4·9 at the show. The average butter product from the herd gives 11b. from a little less than 2galls. of

milk. The dairy plant is very complete and is worked by steam. He has a nice lot of pure-bred poultry, including Minorcas, Andalusians, Langshans, Dorkings, Indian Game. The land is light, and more suitable for grass than for cereals. Some barley and oats, soaked in 7lbs. phosphates to the bushel and sown, looked remarkably healthy. There were a few good pigs in the yards. The homestead is snug, rather heavily sheltered by pine trees.

Mr. W. Barrow's Farm is on the Penola Road. The homestead is quite up to date, dwelling-house, barns, stabling, chaffhouse, shearing-sheds, shelters, garden, &c., all capacious and complete. Over 1,000 sheep are kept, a good herd of cows, pigs, poultry, a good area of land under wheat, barley, and potatoes. The homestead is well sheltered by trees and hedges. The orchard and flower garden are both well stocked and well kept. The visitors had a substantial lunch provided by Mrs. Barrows.

Mr. J. C. Ruwoldt's Farm, at Square Mile, consists of over 100 acres of rich volcanic soil. A field of barley gave promise of over 60 bush. per acre, and other cereal crops were splendid. Potatoes were also showing well. The milking cows were in prime condition, and one cow gives 6 galls. per day. Mr. Ruwoldt runs a bonecrusher, which puts through about 6 cwts. per hour. All the crops to which this manure has been applied show good results. The homestead and surroundings are fairly complete, and are constantly being improved. Mrs. Ruwoldt and daughters control a well-kept flower garden, which is creditable to their industry.

Mr. W. Mitchell's Farm consists of two sections, once part of the Caves Estate; he also owns a good deal of grazing land in the hundred of Riddoch and at Glencoe. The home farm is cropped with wheat, barley, oats, and potatoes, and generally gives good returns, the present season's prospects being quite up to the average. Included in his outbuildings is a well-furnished workshop, where most of the repairs needed on the farm can be effected. A fine belt of pines gives the needed shelter to the buildings.

Mr. J. Umpherston's Farm, "The Caves," was the last on the list. Some fine crops of peas and barley were seen; the latter had been manured at rate of 2 cwts. phosphate per acre, and was exceedingly fine, being stronger in growth and of more vivid green than the strip left unmanured. The trees round the homestead not only beautify the place but add to its value. The fruit trees, of which there are a considerable number, look well. Some interesting discussions took place during the tour of inspection, and at the close the visitors were entertained by Mrs. Umpherston.

Naracoorte, November 12.

Present—Messrs. O. Hunt (Chairman), S. Schinckel, J. Wynnes, E. C. Bates, G. Greenham, H. Smith, and D. McInnes (Hon. Sec.).

WORK OF THE BUREAU.—Mr. Greenham read the following paper:—

In promising to write a paper on the work of the Agricultural Bureau for the twelve months, as recorded in their new *Journal of Agriculture and Industry*, I find that I have chosen a very tough subject, one altogether beyond the scope of a single paper or discussion, and instead of doing this would like to suggest that each Branch should make a practice of having at each meeting a short discussion of the last month's issue of the *Journal*. If the members think this would take too much time the discussion could be limited to say twenty minutes. My opinion is that the members of the Branch do not read and consider the reports and discussions of the Bureau as much as they should do. It is, of course, possible, as was remarked at our last meeting by one of our members, that the "farmers had no time to read"; if so something is very wrong somewhere. To those persons I would like to refer to page 277 in the (October, 1897, issue of the *Journal*, paragraph entitled "Sharpen the Axe." Of the value of the Agricultural Bureau, as worked in this colony, there can be no two opinions, and those members of Branches receiving the *Journal* are neglecting their own benefit if they do not study it. Other agriculturists not belonging to any Branch would find the cost of the *Journal* money well spent. I will leave the main subject of my paper and confine myself to one heading—"The Farmer's Poultry."—Looking around many farms I have been much struck with the different varieties of fowls kept. True, at some places you find some very suitable fowls, but at too many farms they are of very poor quality. Certainly they, in many cases, lay well when every other fowl is laying and eggs are very cheap; but at other seasons of the year when eggs are dear I have known farms where they have not had any eggs for weeks. As one of the valuable minor products of the farm I think that efforts should be made to improve our present results. Towards this end I would recommend that the present stocks should be crossed with other birds. Take for instance six of the best laying hens of medium size, and at breeding time or early spring pen them up with a fair-quality cockerel of a recognised laying bird—the Minorca would be my choice. All the chickens hatched on the place should be from these six hens. As the chickens grow up kill off or otherwise dispose of all the cockerels that have been reared. You do not want them, as they will be of no use for improving the stock. All your next year's layers should be half-bred Minorcas. If you have had a

good hatching season, and if these will not lay more eggs in any given month than most of the ordinary hens as generally seen around a farm, I will be greatly surprised. From time to time I have been assured that the barnyard fowl lays better than any pure bred hen, but do not believe it. It is, however, possible that any person purchasing a pen of pure bred fowls in show condition and turning them loose in the farm yard to live as the others live may be disappointed in the result. As a general rule I think the pure bred birds are of weaker constitution when exposed to neglect, on account of their previous rearing in good quarters and plenty of attention, and possibly being inbred to develop a particular shape or color. The crossbred birds will be equally as healthy as the barnyards, and will undoubtedly give better results. The second year I would advocate the crossbreds to be crossed again either with another Minorca or a Langshan. The finest fowls I have ever seen from the farmer's standpoint were first crosses between the Langshan and the Minorca. They were fine plump birds, with plenty of size, easily confined, and were excellent layers. The same results are within reach of any person desiring to improve their poultry yard. I cannot close this paper without some reference to fowl ticks. You may have noticed something about them in recent *Journals*; the November issue contains some special notices. Coming from the North to this district the fowl tick is no stranger to me. The only method I used there to keep it in check was as far as possible cleanliness of the fowlhouse, with occasional whitewashing, and what was a great deal less trouble—frequent syringing with kerosine emulsion, roughly made with hot soapy water and kerosine. This mode of cleaning the house kept all the lice and ticks in check.

Mr. Greenham read extracts from *Journal of Agriculture* dealing with peach curl-leaf. The Chairman said spraying with Bordeaux mixture would cure this disease, but the treatment had to be repeated each year. He found that spraying the vines was better than painting them with sulphate of iron solution. Mr. Smith said that he found sulphur placed in holes bored in the affected trees a sure cure for curl-leaf, shothole, and other diseases. He was a firm believer in this remedy, though he knew it was laughed at by many horticulturists. The Chairman agreed with Mr. Greenham that the Branches did not sufficiently discuss the subjects dealt with by other Branches. Other members agreed. In regard to poultry, Mr. Wynes said he hatched out some chickens early last year, and these were laying when no one else in the district had any eggs. The Chairman's fowls were principally Langshans, and he found them profitable birds: he believed in regular feeding.

OATS FOR HAY.—In reply to inquiry as to best time to cut oats for hay, the Chairman and Mr. Smith agreed that the best time to cut was when the grain was there.

BRANCH FUNDS.—Mr. Wynes thought it necessary that the Branch should have some fund from which to meet necessary expenses, but he hardly knew what suggestion to make as to raising the money. Mr. Bates thought it rather hard on the members that they should have to pay for disseminating information for the benefit of the outside public. It was suggested that the General Secretary be asked to say how other Branches raised funds for this purpose. [Generally by small levies on the members, which are occasionally supplemented by donations from outsiders. Perhaps some Branch can suggest how money for these necessary expenses can best be obtained.—GEN. SEC.]

BONES AS MANURE.—The Chairman called attention to letter appearing in *S. A. Register* some time back from Mr. A. Thomas, F.C.S., in regard to treatment of bones to convert same into manure, in which he cautioned farmers against the sulphuric acid treatment, and advised the adoption of the system of fermenting the bones in farmyard manure. This was done in the following way:—In a suitable spot put down layer of fresh farmyard manure, then a layer of crushed bones, another layer of manure and bones, and so on. Make a small gutter or drain round the heap to carry off the drainings in winter time to a pit, from which they should be poured back on the heap. In the summer a little water will need to be added to the heap occasionally to keep it moist. Instead of using gypsum to fix the ammonia, the addition of 1 part sulphuric acid to 400 parts water or the drainings from the heap would suit the purpose better. The smaller the bones the quicker the fermentation, and he considered this method better than that usually adopted for the manufacture of super. The

Chairman also read extract from the *Leader*, which gave the analysis of fowl-house manure as nitrogen 32 per cent., potash 17 per cent., phosphoric acid 30 per cent.; 40lbs. of this manure containing as much potash and nitrogen ingredients as 1cwt. of bonedust.

S.E. CONFERENCE.—It was decided that the next conference of South-eastern Branches be held at Naracoorte on the Wednesday before full moon in March, 1899.

GENERAL.—The Chairman reported several cases of impaction recently. Mr. Bates reported damage by grubs. The Chairman showed weed growing plentifully on dry land, also good sample of skinless barley. Mr. Schinckel tabled model of self-feeding trough for stock. Members reported great damage to fruit trees by the winds.

Clare, November 11.

Present—Messrs. J. Christison (Chairman), G. Lloyd, W. Kelly, J. Treleaven, H. Miller, W. S. Birks, C. J. McCarthy, and J. T. Hague (Hon. Sec.).

FRUIT CROP.—Members reported severe damage to all fruit by recent hail-storm. Mr. Christison said that at St. Andrew's quite two-thirds of the grape crop was destroyed, the vines themselves being terribly damaged. The apricots were also seriously damaged. Members stated that, excepting apricots, the fruit crop generally would be light, apples especially so, to the disappointment of growers, who had expected to have a large quantity for export this season. A general complaint amongst apple growers is that trees up to nine or ten years old do not bear. It was generally agreed that the growth required a check, and root and bark pruning were suggested. Several instances were given where trees, after having the bark on the trunk damaged by accident, bore good crops the following season. Mr. Kelly thought it would be as well to try whether varieties which failed to bear regularly would not do better if trained as espaliers. A new disease amongst apple trees is causing considerable anxiety. Some of the main branches cease to grow, the tips die, and no new wood is made. The bark becomes darker and does not come away readily. The diseased branches appear on various parts of the trees, the other part being all right and growing vigorously.

Balaklava, November 12.

Present—Messrs. C. L. Reuter (in chair), A. Manley, C. H. Reed, W. Smith, and E. M. Sage (Hon. Sec.).

DISEASE OF APRICOTS.—Mr. Reid said several of his apricot trees were dead or dying, and he attributed to frost. The Hon. Secretary had never heard of these trees being injured by frost in this district, although the fruit was frequently cut. He believed Mr. Reid's trees were dying from "die-back" disease, which was very prevalent, and which he thought was caused by lack of phosphate in the soil. Three years ago some of his trees commenced to die back; these he headed hard back to three or four year old wood and applied a good dressing of colonial super, using at rate of 3cwt. per acre in some places and up to 7cwt. in others. This had the result of making the trees grow well, and they had not died back since. Where the heavier doses of super were given the trees looked best. To some trees he gave kainit or wood ashes, but this did not appear to benefit them. The soil was of a light sandy nature. This year he headed back another lot of trees showing signs of the disease, but omitted to manure them, with the result that three started to grow but have since died, while the others are none too healthy.

Strathalbyn, November 14.

Present—Messrs. M. Rankine (Chairman), B. Smith, D. Gooch, W. M. Rankine, P. Cockburn, and J. Cheriton (Hon. Sec.).

TUBERCULOSIS.—Paper by Hon. J. L. Stirling on this subject was well discussed, and it was decided to further consider the matter at next meeting.

MANURING.—Members who took part in visit of inspection of crops at Watalunga reported that the crops drilled in with manures are very satisfactory, and with late rains will yield heavily. They were fully satisfied that it will pay farmers to drill fertilisers in with the grain, the main point being the kind most profitable for their respective soils.

Millicent, November 3.

Present—Messrs R. Campbell (Chairman), S. J. Stuckey, A. McRostie, W. Varcoe, H. A. Stewart, H. Oberlander, H. Holzgreffe, H. Hart, W. R. Foster, W. Whennen, and E. J. Harris (Hon. Sec.).

VISIT TO HOMESTEAD.—This meeting was held at the Chairman's residence, and before the business commenced members inspected the piggery, orchard, experimental plots, and other items of interest.

WEEDS.—Mr. Holzgreffe tabled specimen of *Bartsia latifolia*, declared to be harmless, but which was becoming very prevalent in the district. He also called attention to the spread of a thistle which was so thick in some paddocks that the stock could not get through the paddock.

WHEAT-GROWING.—Mr. Stuckey read article from *Advertiser* on "The Future of Wheat," which caused considerable discussion, but it was generally thought that it would be many years before the demand for wheat exceeded the supply.

POULTRY.—Mr. Foster referred to criticisms on paper read at previous meeting. For fowl lice he recommended the application of salad oil or kerosine and oil.

WOOLLY APHIS.—Mr. Stuckey said he had applied soapuds and kerosine to trees affected by woolly blight with very satisfactory results.

Angaston, November 2.

Present—Messrs. R. Player (Chairman), J. Vaughan, F. Salter, P. Radford, F. Thorne, A. Salter, W. Sibley, and E. S. Matthews (Hon. Sec.).

MANURING.—Mr. F. Salter read a paper on this subject. The following are some of the items :—

Nitrogen and phosphoric acid are the more likely plant constituents to become deficient in the soil, and are therefore of the most value or importance. Potash is not of great importance as regards cereals, but for many kinds of culinary vegetables, root crops, and vines and fruit trees, it is of great value. Fresh wood ashes give a fair proportion of potash, but the chief sources are mineral compounds found in various parts of the world. The chief phosphatic manures are crushed bones and mineral phosphates, such as coprolite, mineral rocks, Thomas phosphate, &c. Some of these require a long exposure in the soil before the phosphoric acid becomes available. This is essentially the case with Thomas phosphate (otherwise "basic slag") and the rock phosphates. To make bones more quickly available they are boiled, to extract the fat, then crushed and dissolved with dilute sulphuric acid, mixed with the "soup" resulting from the boiling after the fat has been removed, and the resulting article is "super-phosphate." Sulphuric acid removes two-thirds of the lime from bones, &c., and the remaining compound of one part lime, one part phosphoric acid, and two parts water is easily soluble in the soil. Without treatment with sulphuric acid, the bones, bonedust, &c., would remain a long time unavailable in the soil. He believed nitrogen is not so deficient as phosphoric acid is in our soils. Nitrate of soda from South America gives 95 per cent. pure in many guaranteed samples. It is very easily soluble, and should be applied at same time with the seed, or be used as a top-dressing. Nitrate of potash and sulphate of ammonia are also

nitrogenous manures, the latter produced at gas works, and contains about 20 per cent. of nitrogen. From 100lbs. to 150lbs. nitrate of soda is enough for a hay crop, but it should be mixed with 200lbs. to 250lbs. superphosphate, or 3cwt. bonedust. Break up all lumps, and distribute well. Not more than 1cwt. sulphate of ammonia per acre should be used, well distributed, thoroughly pulverised, and used at sowing or as a top-dressing. The best Peruvian guano contains both phosphoric acid and nitrogen; but that from islands subject to rainfall has phosphate of lime as its principal constituent. Of potash manures, kainit contains usually about 70 per cent. of common salt, and nitrate of potash. sulphate of potash, muriate of potash, &c., are valued according to the percentages of potash contained in them. He thought that commercial fertilisers would be of less value in drought-subject districts (where good crops were seldom secured and consequently the soil was not impoverished) than in localities favored with a good rainfall, and where frequent heavy crops have reduced the available supplies of plant food.

This paper, together with paper read at Congress on same subject, was well discussed.

Mount Compass, November 12.

Present—Messrs. M. Jacobs (Chairman), T. Chaplin, E. Good, C. S. Hancock, A. J. Hancock, F. Slater, R. Peters, D. Wright, and H. McKinlay (Hon. Sec.).

EXHIBITS.—Mr. Jacobs tabled sample of “Herd grass” (*Agrostis alba*), which members considered a capital fodder and thought would make good hay. Mr. Good tabled Quality pea.

RED POPPY.—Mr. Good reported that this weed had made its appearance in the locality. Members strongly recommended its immediate destruction to prevent its seeding.

DAIRYING.—The Hon. Secretary read a short paper on “Shelter for Dairy Cattle,” in which he advocated providing comfortable shelters for their cows, and stall-feeding at night and during the winter when it was very cold. Swedes, mangolds, piemelons, and Broadleaf mustard should be grown for winter feeding with hay.

Pine Forest, November 8.

Present—Messrs. J. Phillis (Chairman), J. St. J. Mudge, J. Flowers, F. Inglis, G. Inkster, and R. Barr, jun. (Hon. Sec.).

YORKE'S PENINSULA CONFERENCE.—It was decided to hold the Annual Conference of Northern Yorke's Peninsula Branches at Bute early in March—probably March 8. The Branches at Arthurton, Bute, Brinkworth, Crystal Brook, Dowlingville, Inkerman, Kadina, Koolunga, Mundoora, Narridy, Nantawarra, Port Broughton, Paskeville, and Redhill to be invited to take part.

WHEAT YIELD.—A discussion took place on the average yield for the district, and it was thought that this would not exceed 4bush. per acre for a radius of eight miles from Bute. The small proportion drilled in with English super is expected to average 9bush.; the bulk being broadcasted without manure will only give about 3bush.

Pyap, November 18.

Present—Messrs. W. Axon (Chairman), G. A. Clarke, A. J. Brocklehurst, H. Mills, J. Harrington, E. Robinson, J. Holt, T. Smith, J. Bowes, J. Aird, B. T. H. Cox, W. C. Rodgers (Hon. Sec.), and two visitors.

RESIN WASH FOR LEMON SCALE.—Mr. Clark tabled leaf of lemon attacked by scale, also leaves and fruit from tree sprayed with resin wash just after the

fruit had set. The spraying had a very beneficial effect, the scales being killed and the young shoots and fruits quite uninjured. A few late flower buds were somewhat injured. Just before the hot weather set in last summer some trees were sprayed and the scale completely destroyed. It was not considered advisable to spray when the trees were in full blossom.

BREAKWINDS.—Tamarisk (*Tamarix gallica*) was considered the best tree to plant here for breakwinds, a row of almonds being planted as an inner break. The tamarisk clippings would be useful in dry seasons for stock. Cuttings for planting in sandy soil should be about 18in. long, and covered to within 3in. of the top. They should not be planted within 24ft. of the orchard.

WHEAT-GROWING.—On October 29th an inspection was made of some of the wheat crops in the hundred of Pyap. A few years ago this land was covered with mallee and pine scrub and classed as desert land, unfit for cultivation. Notwithstanding the fact that the rainfall has only been a trifle over 6in. for ten months, the crops will probably average 10bush. Steinwedel and Velvet Pearl are the principal varieties grown. Although the former is very liable to shake out, its good qualities more than counterbalance this defect. It develops rapidly after the head has formed, and is a heavy yielder. The Steinwedel averages 2ft. 6in. high, and is everywhere superior to the other varieties.

Riverton, October 29.

Present—Messrs. H. A. Davis (Chairman), W. J. Andrew, D. Kirk, T. Gravestock, A. Hannaford, A. B. Welch, C. C. Castine, W. Hannaford, J. Kelly, H. A. Hussey (Hon. Sec.), and several visitors.

DAIRYING.—The Hon. Secretary reported receipt of Jersey bull on loan from the Department of Agriculture, and a committee was appointed to see to his proper care and management.

HAY.—The Chairman read a paper on cutting, stooking, stacking, and general management of hay. They must exercise a great deal of discretion in deciding when to cut their crops; the mixed crops will be first cut. Stooking depended largely upon weather conditions; in rough or wet weather the square or round stook was best, while for finer weather he advocated the long stook, as the hay ripened more regularly and is easier loaded. In stacking he preferred stacks 20ft. to 24ft. wide with square ends. In building, keep the middle well up; if well thatched there should be little if any loss. He dealt with many hundreds of tons of hay last year and did not lose half a ton altogether in his own stacks owing to rain, while others had a great portion of the stacks injured owing to bad thatching.

FLOUR MILL.—The Riverton mill is being fitted up to start early in December, and is expected to prove a boon to the district.

Orororo, November 18.

Present—Messrs. J. Moody (Chairman), M. Oppermann, G. Mathews, H. C. Ives, E. D. Kirkland, and T. H. P. Tapscott (Hon. Sec.).

LOCUST DESTRUCTION.—Mr. Mathews reported that the method of destroying locusts with arsenic, as described on page 276 of the October *Journal*, had proved successful in two places in the district. In his own garden he found thousands of dead locusts lying about. Mr. Ives found that by placing fly-papers near the stems of plants attacked by grubs the latter are trapped and destroyed.

Onetree Hill, November 4.

Present—Messrs. J. Bowman (Chairman), A. Adams, F. Bowman, G. Bowman, J. Hogarth, W. Kelly, F. L. Ifould, and J. Clucas (Hon. Sec.).

KALE.—At previous meeting Jersey tree kale was recommended as a good summer feed for pigs and turkeys, and not Cape barley, as stated in report.

INSECT PESTS.—Mr. F. Bowman stated that a small insect was destroying the young lucern. From what he had read he understood that the lucern pest so common near Adelaide did not attack it at this stage. [This is incorrect. The *Smynthurus* will attack the lucern and anything else in the shape of vegetation at its earliest stages. It is often a difficult matter in the infested districts to get a new crop of lucern started.—GEN. SEC.] Mr. Hogarth noticed young locusts in a paddock that had not been cultivated for years, and where the ova had evidently been preserved from injury. It was reported that the pea crops were being severely injured by grubs in the pods.

WHEAT.—It was reported that the early sown wheats were best in this district, and generally speaking had escaped being blighted. The clay soils had held the moisture best and promise a better yield than the dark loose soils. The application of phosphates also appeared to be more beneficial on the clay bottoms. Members were of opinion that Professor Lowrie's advice to give heavier dressings of super. would be found a mistake in dry seasons. Mr. Hogarth stated that of his crop King's Early Solid Wheat was best, some being about ready for stripping. He also suggested the expediency of sowing some wheat in the orchard, as the sparrows preferring the grain would not touch the fruit while there was sufficient grain left. Dandelion (*Cryptostemma calandulacea*) as hay was favored by members.

ENSIAGE.—Mr. J. Stevens forwarded a paper on this subject, which was well discussed.

Woodside, October 17.

Present—Messrs. R. Caldwell (Chairman), N. Schroder, C. W. Fowler, J. Cuthbertson, J. H. Snell, R. P. Keddie, R. W. Kleinschmidt, J. Hutchens, A. S. Hughes, and G. F. Lauterbach (Hon. Sec.).

STANDARD WEIGHT OF CHAFF.—Mr. Kleinschmidt reported result of discussion of this matter at Congress, and members expressed the hope that the resolution asking that a legal standard weight for chaff should be adopted would soon be given effect to.

SPRINGS.—Mr. Snell read the following paper on this subject:—

Water that sinks into the soil is not permanently withdrawn from circulation on the earth's surface. It is restored chiefly by means of springs. The close connection between ordinary springs and rainfall is known to everyone. In times of drought many springs and wells give a limited supply or fail altogether, while as wet weather sets in they fill again. When water falls on the earth part flows off into brooks and rivers and part sinks into the soil. Some of this is retained by capillary attraction, and remaining near the surface performs a very important work in dissolving plant food. Some of the water soaks through the soil and finds its way through the pores and joints of rocks to a lower level. All rocks are porous to a greater or lesser degree, and many of those which are only slightly porous have cracks varying from the size of a crack in a window pane to quite large passages, and through these the water finds its way. In surface springs, to which class most of those around here belong, the point of escape lies lower than the ground from which the original supplies have been drawn. Springs at the foot of mountains are of this kind. The water sinks till it comes to an impervious bed of clay or rock, and flows onward along the top of this till it comes to a point where, owing to a depression, it finds itself again at the surface, and runs out as a spring. If the bed of clay does not reach the surface, the water accumulating there may be reached by means of wells. As the result of constant percolation and descent of water, the rocks for some way down are in many places charged with moisture; hence in quarries and mines there is a great drainage of the underground water into the opening thus made for it. It is from this water which pervades the soil and rocks that our wells are supplied, and by sinking them deeper we

open up a larger area of drainage, as long as we do not go below the impervious bed. In deep-seated springs the water has risen by hydrostatic pressure as in a syphon. The arms of a syphon may be as long as we choose to make them, yet while one arm is longer than the other and is supplied with water at the top the water will continue to flow out at the shorter arm. So by means of cracks water may rise from a depth of hundreds of feet in the form of a spring. There must be many underground rocks which are permanently saturated with water. These, if they can be reached, will furnish an abundant and constant supply of water. Advantage of this is taken to sink artesian wells. When an impervious bed cover a porous one over a considerable district the water that soaks into the lower bed will accumulate there as in a great reservoir. The water will rise in an artesian bore from this, and may ascend even above the ground. A sketch of the London district shows how the water which filters through the gravel and chalk many miles away is reached through the London clay by means of artesian bores and by wells. The great artesian system of Australia extends from the coast ranges on the east of Australia, across western Queensland, to about our transcontinental telegraph line. The water which sinks into the porous soil on the western side of the ranges soaks away to the westward, resting on an impervious bed which at some parts is at a great depth below the surface, and comes to the surface at about Hergott Springs. As may be seen on the map of Australia here, this is a large extent of country where artesian bores may be expected to be successful, and there are numerous bores there, and more being put down every year. By geology we know that the rocks run generally in a definite order, so that if we find igneous rocks, such as granite, at the surface we need not expect by boring to come to saturated stratified rocks. It is from the knowledge of the general order of rocks, and which are likely to have no water beneath, that it is known when it is useless to continue boring for artesian water.

EXPERIMENTAL PLOT.—Mr. Snell reported that Dr. Esau had given him the use of a plot of land adjoining the school for experimental purposes, and asked members to assist him by giving manure and other requisites at their disposal, which they agreed to do.

Mount Remarkable, November 24.

Present—Messrs. S. Challenger (in chair), A. Mitchell, A. Pope, W. Girdham, W. Lange, G. Yates, T. P. Yates, C. E. Jorgensen, D. Roper, J. B. Murrell, and T. H. Casley (Hon. Sec.).

FLOUR MILL.—Discussion took place on question of starting a flourmill in the district, there being no mill within thirty miles. Members were of opinion that if a suitable mill for gristing could be procured for a reasonable amount it would be profitable to run it on co-operative principles, as it was too far to cart wheat thirty miles for gristing.

WASTE BINDER TWINE.—Mr. Jorgensen tabled very good sample of mat made from waste binder twine.

Port Elliot, November 26.

Present—Messrs. C. H. Huasey (Chairman), H. Green, H. Pannell, J. Davidson, E. Hargreaves, and J. McLeod.

JADOO.—Mr. Green exhibited sample of this material, which he considered too expensive for use with farm crops however useful it might be for seeds and young plants. Owing to small attendance no other business was transacted.

Inkerman, November 1.

Present—Messrs. J. Sampson (in chair), W. Board, D. Fraser, S. Wills, and W. A. Hewett (Hon. Sec.).

GRUBS.—Discussion took place on circular from General Secretary *re* underground grubs. Mr. Board thought this grub existed in the district, but it had never been identified. He thought the color of these underground grubs varied with the soil they live in. Mr. Sampson said the grubs which trouble

them eats the leaves of vines, &c., as well as the roots of wheat and grass, hiding in the soil during the day. [This "grub" is really a caterpillar, and quite distinct from the root-feeding grub which has done so much damage to wheat crops. The caterpillar can be destroyed by sprinkling small pieces of the Paris green bran and sugar mixture amongst the plants attacked.—GEN. SEC.] Mr. Fraser found a small grub doing considerable damage to his wheat crops a few years ago. As they were worst on land ploughed rather late, where a quantity of grass was turned under, he decided in future to allow this sort of land to lie for a week or two after ploughing, and then to work it again well before sowing. He had also resorted to heavy rolling, and believed he had at least kept them in check.

Mylor, November 26.

Present—Messrs. W. Nicholls (Chairman), E. J. Oinn, W. H. Hughes, P. P. Probert, S. Phipps, T. Mundy, W. T. Elliott, F. G. Wilson, O. A. Witt, W. G. Clough (Hon. Sec.), and seven visitors.

CO-OPERATION.—Mr. G. Monks, of Forest Range Branch, read a paper upon "Co-operation," to the following effect:—

The word "co-operation" in its widest sense means the union of a number of people for collective as well as individual benefit, by eliminating as far as possible all intermediary agencies between producer and consumer—otherwise to dispense with "middlemen"—so that the producer shall reap the full benefit of his labor, and the consumer shall enjoy the advantages of direct trade with the producer, and be free from the extra prices exacted by the middlemen. This applies with especial force to the horticultural industry. That there are difficulties in the way of effecting this object no one can reasonably doubt, but these can be overcome if the producers will be true to each other and determine to cultivate just what is required, and if consumers will take as much as they can. The two bodies must work together for the common weal. There may be some difficulty in raising the necessary large amount of capital. Producers should not be allowed to monopolise the shares in such a co-operation, but consumers should be allowed to participate in the advantages. When sufficient capital is provided, a central depot in Adelaide should be established, with branches wherever required. Perhaps the Corporation or the Government might be induced to erect a suitable depot and charge a reasonable rental for its use. If so, less capital would be required. When established the co-operation would avoid committing the serious error that was perpetrated by a few individual growers last season, and would send their surplus fruit to London through the Export Produce Depot. Producers would not only secure better prices (whilst consumers would purchase at lower rates), but they would also be able to purchase goods, implements, manures, &c., wholesale, with considerable advantage to them co-operatively and individually. The producers were to some extent blamable, in so far that they raised more of certain kinds of produce than could be disposed of under present conditions of distribution, and in many cases they depreciated the price of really good products by placing quantities of rubbish upon the market, which should be fed to animals or else thrown upon the dunghheap.

EXHIBITS.—Mr. E. J. Oinn tabled samples of loquats, a very heavy bearer, also cherries, and Purple Straw wheat grown by Mr. C. Neilson. Samples of Dart's Imperial wheat and Menshury barley were also tabled.

Narridy, October 29.

Present—Messrs. A. Bairstow (Chairman), A. McDonald, W. J. Martin, J. Liddle, D. Creedon, J. Nicholson, J. C. Myatt, R. Satchell, and J. Darley (Hon. Sec.).

CONGRESS.—Mr. Martin gave a *résumé* of transactions of Tenth Annual Congress, and advised members that it would be greatly to their advantage to attend these annual meetings of the Bureau.

FRUIT DROPPING.—The Chairman inquired reason for trees losing their fruit. Mr. McDonald attributed it to the effects of the weather, and advised planting breakwinds.

WHEAT.—Mr. Satchell reported that Dart's Imperial wheat proved the best of any he had for withstanding the dry weather and strong winds. Members reported that in some cases as much as 7bush. per acre had been shaken out of Steinwedel wheat. The best varieties for the district were considered to be King's Jubilee and Steinwedel. The latter was recommended to be sown with Bearded wheat, as the latter would help to keep it from going down or shaking out. Mr. Satchell wished to know at what stage wheat was most susceptible to injury by frost.

Lyndoch, November 24.

Present—Messrs. H. Kennedy (Chairman), W. Rushall, S. Sage, W. J. Springbett, W. McIntyre, and J. Mitchell (Hon. Sec.).

DAIRYING.—The Chairman reported visit of Dairy Instructor, who delivered an interesting address on dairying. He had promised to visit the district at a later date and give practical demonstration in butter and cheese making. The Chairman also reported on proceedings of the Annual Congress in Adelaide.

VINE-GRAFTING.—Mr. Springbett read an interesting paper on this subject, which was well discussed. Mr. Sage promised a paper on wine-making.

EXHIBITS.—Mr. Springbett tabled good samples of Menshury barley and Dart's Imperial wheat.

Paskeville, November 26.

Present—Messrs. A. Palm (in chair), T. Trebilcock, A. Goodall, J. C. Price, F. Bussenschutt, and J. H. Nankervis (Hon. Sec.).

FIELD TRIAL.—Owing to lack of entries the proposed field trial of harvesting implements in connection with the Bureau Field Trial Society has been postponed.

UNDERGROUND GRUBS.—The committee appointed to take steps to raise funds with which to purchase the beetles of the underground grubs, which have done so much harm to the wheat crops, reported that they had made arrangements to pay 2s. 6d. per lb for the beetles. A levy was made on the members of the Branch to form the nucleus of the fund, and it was decided to ask the local district council to help.

THE VALUE OF STRAW.

O. J. VINE.

Farmers who live in grain-growing districts and have plenty of straw do not value it as they should, or give it the care it deserves. Instead of keeping it under cover or even stacking it carefully, it is simply threshed on a heap in the field and allowed to rot there. If one is not provided with a barn or shed in which to store it, it can be so stacked that the loss will be small. The main point to be observed in stacking is to keep the middle high and well tramped, then when it settles the outside will all slope downward and the stack will not take water. If well topped, with hangers on to prevent the wind blowing the top off, it will keep in good shape an entire year. By cutting down the stack in sections and using an entire section before beginning another, very little need be wasted. It is not nearly so convenient, however, as when stored in the same building where used. Much of the most valuable portion of the chaff is wasted when stacked outside.

Good straw ranks higher in feeding value than most farmers are inclined to admit. They seldom feed much of it, because they usually have plenty of hay, and only feed straw sometimes out of necessity.

An occasional feed of straw furnishes a variety, will be eaten with relish, and do farm animals as much good as if the feed had been hay. Animals that are fed carbonaceous feed, especially if concentrated, will eat straw readily and be much benefited by it. I have seen fattening sheep that had been fed large quantities of corn eat the straw placed under them for bedding twice a week in preference to good clover hay in their mangers. Comparatively idle horses can be kept on straw largely without any increase in their grain rations and be in good condition the following spring. Good, bright straw is better feed for a horse than damaged, musty hay of any kind.

Where straw is made a regular part of the ration I prefer putting it under the mangers, and allowing them to select such as they prefer, using the remainder for bedding. They prefer the chaff to anything else. Some farmers have the chaff separated from the straw when threshing and store it in the barn, using it for feed during the winter, while the straw is stacked outside. It is well to remember that straw fed in a good, warm stable will produce nearly or quite as good results as hay fed in the yard, where a good part is wasted. Considerably more feed is required to support an animal out of doors in winter than in a warm stable.

Both wheat and oat straw compare very favorably with clover and timothy hay in proportions of nitrogen free extract, or carbohydrates and fat. They are mainly deficient in protein, especially when compared with clover. This deficiency may readily be overcome by feeding bran, oil, or cotton seed meal. It should be remembered, too, that clover hay is exceptionally rich in protein. The following table gives the composition of each:—

	Protein.		Starches, Sugars, &c.		Fat.
Wheat straw	3·4	..	43·4	..	1·3
Oat straw	4·0	..	42·0	..	2·3
Clover hay	12·3	..	38·1	..	3·3
Timothy	5·9	..	45·0	..	2·5

Aside from the high value of straw as feed, it also has great manurial value, and none should be wasted. It is the natural base or foundation for all stable manure. It is one of the best absorbents we have in any quantity on the farm, and it should all be used for that purpose. Unless used for bedding and saturated with liquid manure, it is of little value as a fertiliser. Liquid manure contains more plant food than the solid, and all of it should be carefully saved. The most satisfactory way of saving it is by absorbing it with straw or other suitable material.—*American Agriculturist*.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

The Printing Trade.

Linotype Composing Machines and the Newspaper Offices.

The introduction of "Linotype" composing machines into newspaper printing offices for the purpose of displacing the system of setting up movable types of the sizes commonly used for newspapers and books—the system known in the trade as hand composition—necessitated the drawing up of working conditions and a scale of charges applicable to the new order of things. At the beginning of the present year machines arrived in the colony for each of the daily newspaper offices—the *Register* and the *Advertiser*—and the Typographical Society, having had notice of their proposed introduction, lost no time in obtaining information from the other colonies, where the machines had been in operation for some time, regarding the conditions under which they were operated. With this information at their disposal the board of management addressed itself to the task of compiling a scale for submission to the daily newspaper proprietors, and in due course copies of a proposed scale were forwarded to them for their consideration, with a suggestion that a conference should be held to discuss the same. This conference took place early in October, and, with the assistance of an experienced operator from Melbourne, who supplied information on all points requiring elucidation, the scale was got through in a form which was considered acceptable by both parties—the proprietors of the daily papers on the one hand and the representatives of the society and of the compositors engaged in the offices on the other. This scale was subsequently confirmed by a ballot of the members of the society, and is now the recognised agreement under which those employed on the linotypes in the newspaper offices are working.

It is pleasing to note this peaceful inauguration of a new system of working in connection with so important a branch of industry as the printing trade, and both the employers and the employes may fairly be congratulated on satisfactory terms having been arranged.

The introduction of the linotype has greatly affected the earnings of the "case hands," the average amount of composition done at the machines by each operator being already very much beyond what the same men could do at case. Parents who may have been thinking of making compositors of their sons will perhaps be interested to know that while a "hand compositor" who can average 2,000 "ens" an hour is considered to be above the ordinary man in capability, an operator on the linotype is required to compose and correct an average of 7,000 "ens" an hour in order to be considered worthy of a position at the keyboard. It is evident from this fact that when in the newspaper offices a sufficient number of the employes have become efficient there will be considerably less than the present number of men needed to do the requisite amount of composition. Already some of them are looking round to see what there is that they can turn their hands to outside of their own trade.—CONTRIBUTED.

The Recent Strike at the Broken Hill Proprietary Block 14 Company's Works at Port Adelaide.

About eighteen months ago a system of horse haulage for conveying slag from the smelter yard to the tipping dump was adopted, and it was then proposed to reduce the number of slag-wheelers serving the furnaces to an extent corresponding with the saving of labor thus brought about. It was undertaken that other work should be provided for the men who would have been affected by the change, but the slag-wheelers as a body resisted the proposed reduction and some of them struck work, and, although the furnaces were unquestionably overmanned, the matter was allowed to stand over until further changes became necessary.

Recently, material of a more refractory nature than that dealt with formerly has been treated, with the result that the smelting furnaces have been running at considerably less than their former speed. This rendered the overmanning above referred to a more serious matter, and it was finally determined that the number of hands about the furnaces should be reduced.

On September 21 the shift-bosses were instructed to run the five smelters with a crew of thirteen instead of seventeen charge-wheelers per shift, and of eighteen slag-wheelers instead of twenty-two per shift. The reduction was resisted, and on September 22 the whole of the charge-wheelers struck work, and left the furnaces fully charged notwithstanding that they were given the opportunity of going on as before for ten days. Other men were then employed to run down the furnaces during the following twenty-four hours, and preparations were made for an extended strike. During the next few days a large number of men gave in their names as being willing to go to work under the proposed conditions, but the majority of those who were directly connected with the strike held out until after the 28th September, when three delegates, together with the Members of Parliament for Port Adelaide, Messrs. Archibald and McGillivray, waited upon the directors and the officers of the works, and after discussing the various circumstances connected with the dispute an amicable understanding was come to.

However, a certain amount of feeling was still exhibited, a number of the charge-wheelers contending that they would be overworked under the new arrangements. The company therefore sought to end further disputing by having the charge-wheeling done by contract. Tenders were advertised for the work, and one was accepted, it being laid down as a condition of the acceptance, that the charge-wheelers formerly employed should be engaged by the contractors as much as possible.

Two smelters were started on the 6th October, and the other furnaces as soon afterwards as possible, and by the 26th October the works were again in full operation.

Immediately before the strike 450 men were employed at the works, a number of whom however were engaged on construction work. The number of men now employed is about 460. The charge-wheeling, in which about forty men are employed, being done by contract. The slag-wheeling is not done by contract. The changes made affect eight men per shift, equal to a total of twenty-four men. For the present the number of men employed in construction work will be less than formerly.

Workmen's Compensation Bill.

The Right Hon. the Attorney-General has introduced this Bill into the House of Assembly, and in moving the second reading on November the 16th, stated, as reported in *Hansard*, that it was founded on the Imperial Act of 1897, but

that the Bill had been brought up to date, and included amendments moved in the present session in the House of Commons, for which Mr. John Burns and others were responsible. The Bill did not interfere with existing legislation on the subject of Employers' Liability. The Act of 1884 and the Amending Act of 1889 remained untouched. Those who had remedies under them would be at liberty to avail themselves of them, but at the same time the measure was so framed that the master should not be twice harassed or so that the claim could be made under both Acts.

The party injured must make his choice whether he proceeded under the Employers' Liability Act or the Workmen's Compensation Act.

The Bill has passed the House of Assembly, and was sent up to the Legislative Council on the 24th of November, 1898.

The Brickfields of West Torrens and Mount Barker.

The centre of the brick-making industry is situated at Hindmarsh, Brompton, Bowden, Ridleyton, and its neighborhood. At present the trade is in a very flourishing condition. There are twenty-five manufactories in full work. The bricks (of which there are about fifty kinds) are made both by machinery and by hand; this does not include the various kinds of terracotta manufactured. The number of bricks turned out in the various yards number 900,000 per month. The kilns used in burning are the Stafford or Dome and Hoffman's patent, but the old square kiln is principally used in the district. The bricks are exported to Western Australia, Tasmania, and Broken Hill, and to all parts of the colony. The number of men employed in the works is about 250, and fifty boys. All work on the eight hours system.

At Littlehampton business is also brisk—about 100,000 being made every month. Fire-bricks, tiles, and fire-clay, is also sent out. All the bricks are moulded by hand. The products of the yards at Littlehampton are sent all over the colony and to Broken Hill. The number of hands employed are men, fifteen; boys, seventeen. A large number of men are employed cutting wood for burning bricks, and in carting the products from the kilns.

Port Pirie—A Busy Port.

The return annexed shows the number of vessels and their cargoes for the month of October, inwards and outwards, but does not include the small craft, about thirty, engaged in the flux trade, nor the steamers running to Port Adelaide.

The loading and unloading of these ships gives employment to about 200 wharf hands, lumpers, and laborers. The men usually work from 6 a.m. till 6 p.m., with two hours off for meals and two "smoke ho's" of twenty minutes each.

The rate of pay is 12s. per day. Overtime is worked when shipping is brisk, the pay being 2s. per hour. The work is very hard, and it requires a strong man to trim concentrates or shovel coal down the hold of a ship for a day of about nine hours, yet they do it day after day, and if necessary can work on overtime for long periods when a vessel has to be unloaded or cleared.

In addition to the lumpers a number of men are employed on the wharves attending the donkey engines, driving the horse teams, and shunting trucks.

In the busy season work goes on night and day, and when the wheat harvest is finished the volume of business at this port will be considerably increased.

SHIPS INWARD DURING OCTOBER, 1898.—S.s. *Afrikander*, 1,793 tons, in ballast; s.s. *Glaucus*, 3,590 tons, in ballast; s.s. *Orwell*, 3,446 tons, in ballast; s.s. *Brator*, 1,829 tons, in ballast; s.s. *Ayr*, 1,955 tons, in ballast; s.s. *Oak Branch*, 2,064 tons, in ballast; *Newsboy*,

509 tons, 695,610 super ft. timber; Nympe, 2,049 tons, 2,418 tons coke; s.s. Egremont Castle, 1,834 tons, 2,800 tons coal; s.s. Willyama, 1,713 tons, 3,000 tons coal and 360 tons coke; s.s. Andania, 1,828 tons, 2,250 tons coal and 451 tons coke; s.s. Age, 1,493 tons, 770 tons coke; s.s. Kadina, 1,706 tons, 3,400 tons coke; s.s. Bucephalis, 1,192 tons, 1,025 bales bags; s.s. Maritta, 1,936 tons, 1,750 tons coal.

SHIPS OUTWARD DURING OCTOBER, 1898.—S.s. George Fleming, 2,228 tons, 2,504 tons lead concentrates; s.s. Afrikander, 1,793 tons, 1,525 tons lead concentrates; s.s. Larnaca, 1,492 tons, 100 tons antimonial metal, 200 tons matte, 400 tons lead, 760 tons lead concentrates, 505 tons concentrates, 25 tons flour; Amulrie, 1,329 tons, in ballast; s.s. Age, 1,493 tons, 875 bales wool, 300 tons lead, 248 tons concentrates, 466 tons concentrates, 42 tons chaff, 2 cases sundries; s.s. Brator, 1,829 tons, 1,000 tons zinc concentrates, 519 tons sulphide concentrates; s.s. Egremont Castle, 1,834 tons, 2,000 tons lead and 180 tons concentrates; s.s. Willyama, 1,713 tons, 20 tons lead, 583 tons concentrates, quantity machinery; s.s. Glaucus, 3,591 tons, 3,000 tons concentrates and 231 bales wool; s.s. Ayr, 1,955 tons, 1,900 tons zinc concentrates; s.s. Orwell, 2,446 tons, 2,548 tons zinc concentrates; Prince Robert, 2,654 tons, in ballast; s.s. Andania, 1,828 tons, in ballast; s.s. Kadina, 1,706 tons, 1,880 tons lead and 450 tons concentrates; s.s. Oak Branch, 2,064 tons, 1,750 tons zinc concentrates; s.s. Maritta, 1,936 tons, 1,500 tons lead concentrates.

The Labor Bureau.

The Superintendent of the Labor Bureau reports that the new department is now in full operation. Up to date over 1,600 names have been registered at the Central Bureau and country agencies, and 472 men have been dispatched through the Bureau to various works, including Bundaleer; Nectar Brook; Beetaloo; Outalpa; the Locomotive Department; Resident Engineer, Adelaide; General Traffic Manager, Adelaide and Port; Ways and Works, Glanville; Waterworks; Resident Engineer, Petersburg; the Postmaster-General; and private employers in town and country.

The above men include laborers, platelayers, boilermakers, riveters, riveters' assistants, carriagemakers, blacksmiths and blacksmith's strikers, fitters, wattle strippers, harvesters, carpenters, painters, and masons.

The Government have directed that all applications for work in connection with the Locomotive Shops and the Railways generally must be registered at the Labor Bureau.

The books kept by the General Traffic Manager and Locomotive Engineer have been closed, and applicants referred to the Central Bureau.

Although such a large number of names have been registered at the Bureau it does not follow that all those so registered are willing to work, as in numerous cases men selected, and who had signed agreements to proceed to work, have not turned up at the time appointed for leaving Adelaide, while others have made excuses for not going away. Others again have refused point blank to go to work provided for them in the country. In fact considerable difficulty has been experienced in inducing men to go to distant jobs such as Outalpa and Nectar Brook.

Government Labor Bureau, New South Wales.

From the annual report for the year ending June 30th, 1898, and laid before the Legislative Assembly in Sydney last month, the following information has been extracted from the able report of Mr. Crer, its superintendent:—

"Labor and Industry.

"The Minister's recent instructions directing that in future all applicants to the Bureau for registration, passes, or other forms of assistance, must first produce their elector's right or some other satisfactory evidence to show they are *bona fide* colonists, has caused some peculiar revelations. It has been found that hundreds of men, some of whom have all their lives been in the

colony, had not only failed to enter their names on the electoral rolls of their districts, but had never in the whole course of their lives been in possession of an elector's right and had never recorded a single vote at the ballot-box.

"In compelling these to procure elector's rights we have during the last two months added considerably to the electoral rolls of the colony.

"The returns of the Government Statistician show that the increase of population for the year ending June 30th is equal to 24,360, which is a very large increase to the consumers in the colony. It also means that there will be an increase of thousands of young men just into manhood, most of whom will be competitors with the industrial classes in the battle of life, requiring increased avenues of employment to enable them to successfully do so.

"Wages.

"As is generally known the Bureau does not interfere with the terms or conditions of employment. Its main object is to bring employer and employé together, leaving it to the parties themselves to make their own arrangements.

"In cases, however, where an employer offers what is considered a very low wage, we sometimes point out that he cannot expect to secure a good man at his rate of wages, and frequently by these means an increase is obtained for the man and a better standard of labor for the employer, thus disproving the groundless assertion made at times that the Bureau has been the cause of a reduction in wages generally.

"The rate of wages paid to-day when compared with that paid some ten or twelve years ago to skilled and unskilled labor shows a very great reduction, in many cases from 25 per cent. to 40 per cent. This, however, is not peculiar to New South Wales, the same thing (excepting the different professions and perhaps shearers) having occurred in the other colonies. The reduction in the remuneration for labor has been in operation by slow degrees for a number of years throughout Australia.

"It may be somewhat difficult to definitely account for this great reduction. Keen competition has had a great deal to do with it, and unreasonable and ill-advised disputes and strikes have also assisted to occasion it. Every strike which took place in the Newcastle district reduced the foreign trade and assisted in opening up a coal trade in other parts of the world, which became their competitors, until the foreign trade formerly enjoyed by the Newcastle collieries has to a large extent disappeared. Very few of the many strikes which took place had the effect of benefiting the miners; indeed, in almost every instance they returned to work worse off than when they left it.

"Newcastle, under reasonable conditions, should be the most prosperous district in Australasia.

"There is, I am pleased to say, a strong probability of the selling price being raised to 8s., and a proportionate increase in the hewing rate.

"The alien question is one which, even at the present time, affects the standard of wages, and which if not soon remedied will materially reduce the wages of our own workers in the near future.

"There are constantly arriving in the colony large numbers of Hindoos, Mahomedans, Afghans, Cingalese, Syrians, Greeks, and other foreigners. Many are engaged by employers seeking cheap labor, to the detriment of our own people. These foreigners can live on so little, as compared with Australians, and their habits of life being so different, that they become very dangerous competitors in the avenues of employment which they enter. Only recently two Hindoos or Afghans, I am not sure which, applied at the Bureau for work. They described themselves as carpenters, and said they would work cheap. Not being in possession of electors' rights we refused to register them.

"At the present time the market gardening is monopolised by Chinamen, as well as the distribution of vegetables, not to speak of the large hold they have on the cabinet-making trade.

"The retail fruit and fish industry is monopolised by the Italians; and the hawking and peddling chiefly by Assyrians.

"The great danger is in the industry and perseverance of these people; and their mode and habits of living are such that our own colonists cannot compete with them. At the same time our people would do well to emulate their industry, perseverance, and determination.

"The reduction of wages generally was first due to the completion of our large public works in 1885. From 1880 to 1885 the sum of £5,242,807 was expended on public works, and while these were in progress work was brisk and wages good. Then we had the memorable land boom (1882 to 1891) which collapsed in 1892-3, the effect of which proved most disastrous to the colony. Depression became marked; and soon work of all kinds became scarce, with a general reduction in wages. This condition of affairs was accentuated by the maritime strike of 1890. However, as already mentioned, there are indications of better times in the near future."

The report then goes on to refer to other matters, which may be mentioned in a future number of this *Journal*.

Rate of Wages Paid at Broken Hill.

The labor agent, Broken Hill, reporting to the Superintendent Government Labor Bureau, Sydney, reports:--Mechanics are easily obtainable from Adelaide when required, and the supply of miners from New South Wales and the adjacent colonies is quite equal to the demand.

Rate of Wages (per day).

Apprentices, machine shop, 4s. to 5s. 6d.; machinery smiths, 10s. 6d.; general smiths, 8s. 4d. to 10s.; blacksmiths' strikers, first grade, 7s. 6d.; ditto, second grade, 6s.; boilermakers, 9s. to 10s. 6d.; ditto assistants, 7s. 6d.; boys (all), 2s. 6d. to 5s.; carpenters, first grade, 10s. 6d.; ditto, second grade, 9s. 6d.; ditto, third grade, 8s. 4d.; drillers, machine shop, 8s. 4d. to 9s.; electricians, first grade, 9s. 10d.; ditto, second grade, 9s.; engine-drivers, winding, 10s.; ditto, stationary, 9s.; ditto, winch, 8s.; firemen, 8s. 4d.; fitters, 9s. to 10s. 6d.; lathe hands, machine shop, 8s. to 10s. 6d.; locomotive drivers, 10s.; ditto, stokers, 8s. 4d.; masons, 9s. to 10s. 6d.; planers, machine shop, 9s. to 10s.; riveters, first grade, 9s.; ditto, second grade, 8s.; screwers and shapers, 7s. 6d. to 9s.; tinsmiths, first grade, 10s.; ditto, second grade, 9s.; furnace feeders and tappers, 9s.; charge wheelers, 8s. 4d.; miners, 9s.; platmen, 8s. 4d.; braccemen, 8s. 4d.; truckers, 7s. 6d.; all unskilled manual laborers, 7s. 6d.

Station Employés.

Shepherds, 15s. per week, with rations; boundary riders, 20s. per week, with rations; overseers, 25s. per week, with rations.

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[A NEWSPAPER. VOL. II.]

NOTES AND COMMENTS.

The weather during the month has been very changeable, and rather too windy in the early part for the good of the crops. With some varieties of wheat several bushels to the acre have been shaken out of the heavier crops and reaping has been somewhat delayed. Taken as a whole, the returns so far are somewhat better than was expected a month ago. The low price offering for wheat is a serious matter to the farmers, who ought to consider whether their position can be improved by direct shipments to British and Continental ports through the Farmers' Union.

In view of the satisfactory returns from early wheats, the following notes from Mr. R. Marshall, of Tenplers, concerning the value of Bartlett's Cross-bred wheat will be interesting. He states that about four years ago he obtained a small quantity of seed from the Agricultural Bureau, and has grown the variety ever since. During the past season he sowed one bag of seed over six and a half acres, and reaped 24 bush. per acre. The variety is so early that the very dry weather in September did not seem to affect it like other varieties. It was sown side by side, under precisely the same conditions, with Early Para, and came into ear about seventeen days earlier. The latter variety being cut for hay the difference in ripening was not ascertained, but Mr. Marshall is of opinion that it would be quite fourteen days in favor of Bartlett's Crossbred. For the dry areas he is confident that this wheat would if grown give the farmers a better chance of a crop in dry seasons than the varieties usually cultivated. Mr. Marshall has also a very early solid-strawed wheat of his own raising, which is fit to cut for hay with the wild oats, a great help in cleaning the land. This he has named "Marshall's Early Solid Straw," and should prove a very valuable wheat for hay.

As the losses in ripening crops have been so serious this year through the grain shaking out, it behoves our farmers to pay special attention to the selection of varieties which hold their grain well, and to the improvement of this quality in our wheats. The man that can produce an early ripening prolific wheat which will not shake out, and with grain of good milling quality, will be a benefactor to the colony.

It having been decided to provide a continuous hay and straw-baling press for Roseworthy College farm (in fact, one has been purchased, and is probably now on its way from England), we may hope to see illustrations by Professor Lowrie of the use of baled straw for erection of barns, outhouses, shelters, &c., as used for a long time past in Texas, U.S.A., and lately in some parts of Australia. The bales are pressed so compactly that the straw is practically as much fireproof as wood is; they are quickly and easily built up in a solid wall by aid of a couple of 10in. dowels, sharpened at each end, for each bale; the walls are thick, impervious to heat, cold, wind, and rain, and the bales can be utilised in times of drought as food for starving stock. At a contest in England, under auspices of the Royal Agricultural Society, the cost of baling straw was only sixpence per ton!!!

From an American agricultural paper the following item concerning threshing-machine gangs are collected:—The threshing-machine is usually owned by one or more men who employ a dozen men to work it. They shift the machine from heap to heap perhaps four or five times daily, and thresh 2,000 bags of wheat cleaned fit for market, stack the straw, cavings, &c., bag the chaff, and charge from 2½d. to 4d. per bushel, according to condition of crop, difficulties, &c. It is reckoned that the straw is worth £4 when best hay is worth £5 per ton, or if hay were worth £2 per ton the straw cut with self-binding reaper would be worth £1 12s. per ton. About 95 per cent. of straw consists of organic matter, containing a good proportion of nitrogen, which is the most costly of fertilisers to purchase, but which may be saved and applied without cost of cartage or spreading if fed to live stock.

The haulms or straw of broad beans, peas, sunflowers, buckwheat, oats, barley, wheat, are all liked by stock, and should be saved for the animals. If these can be chaffed and steamed, all the better. Stacks of these substances can be erected on the fields and left to serve as shelter and fodder for stock; but, in order to prevent them toppling over when eaten away at bottom, some 12ft. poles should be put in around the stack at 12ft. apart; connect these at top with a triple fence-wire, and bolt two lines of poles near the bottom at 2ft. and 4ft. above the soil, to serve as a fence. The animals will eat away the bottom of the stack, and it will continually subside without falling upon and smothering the stock. Sheep will eat more of this fodder than most other animals, and will thrive better.

Cleanliness is the first step to prosperity. Job recommended people to "be clean, and change your garments." Clean fields will yield good crops of seed, and clean seed brings top prices. Clean pastures conduce to healthy stock; clean dairies produce best butter and cheese. The cleanly-clad man commands respect and claims credit at the store if he requires it—which is seldom. The clean orchard will be profitable; but dirt breeds disease.

In the December issue, page 438, line 4, a mistake occurs which altogether alters the meaning of the sentence; the word "not" being omitted. Line 4 should read "it is *not* merely sufficient to manure next to where the seed has been dropped."

The "general purpose" cow will not pay to keep for dairy purposes. Old cows do not make good beef, and calves scarcely pay to raise for the butchers. It is not true economy to maintain 300lbs. to 500lbs. extra flesh on a cow for, say, five years, when a smaller cow will require one-third less food and produce 300lbs. to 500lbs. more butter during the time. Then, too, the profit from the extra butter is coming in all the time, whilst the owner of the big cow has to wait five years for the price of his "old cow beef," and must give her extra feed all the time to maintain it.

Many a time it has been asserted by farmers, after a dry season, that the cows and fowls gave the best returns from the farm, and that the labor of the wife and daughters in tending these sources of revenue had defrayed all the household expenses. But there is a further profit or advantage connected with poultry which is almost always overlooked. Ducks, turkeys, hens, and guinea fowls are indefatigable in destroying grubs, beetles, caterpillars, worms, and all sorts of farm and garden pests. They will even eat mice, young snakes, and other small vermin. The turkeys eat enormous quantities of insects, and the number eaten by other varieties of poultry would surprise anyone who takes the trouble to inquire into the matter.

There are four items which every owner of cows should constantly remember. The first is, to keep a record of the milk production of each cow for a year (if he can record the butter yield and cost of food for each, so much the better). The second point is to prevent the production of horns on his young cattle by removing the hair around the "bosses" where the horns would be produced, then damp lightly with water, and rub only on the bosses with lunar caustic until the skin appears inflamed—about two or three minutes. The third point is to remember that a tablespoonful of carbonate of soda in a winebottle of water if administered to an animal which has eaten grain, lucern, clover, or other food causing it to be "blown" (otherwise called "tympanitis," or "hoven," or "blast") will at once remedy the evil. Lastly, when a cow is attacked with "milk fever" after calving, the best remedy is to give her at intervals of three hours two doses of brandy and water—about half a bottle at each time—and keep the bowels open.

Milk has always been a vehicle for the conveyance of consumption (tuberculosis), typhus fever, scarlatina, diphtheria, and some other diseases, to human beings. Perhaps only one cow amongst fifty may be affected with tubercular disease, but if the milk of that diseased cow is mixed with the pure milk of the other forty-nine cows the whole of that milk is infected with germs of the disease. The milk can be made innocuous by subjecting to a temperature of 160°F. for a quarter of an hour, or more easily by boiling it. It is not safe, however, to the health of the public to allow milk to be used without a proper and strict supervision of all dairies and milking cows. There are too many people who will never take the trouble to pasteurise or cook milk before using it.

Where farm cattle are continually chewing bones, rags, &c., it is proof that there is something deficient in the food supply. Some people say it is salt that is wanted, others affirm that phosphorus is the deficient article. Whatever it may be, it is desirable that an effort should be made to supply the deficiency. Salt can be provided in the form of "lick-stones" (rock salt) placed under cover, or even exposed to open air. Phosphorus can very easily be supplied in the form of fine bonedust, sifted out from the farm manure, and mixed with damp bran, chaff, &c. *Do not use superphosphate, however.* The bonedust will not be lost, because any that remains undigested will be deposited on the fields and pastures.

Mr. W. L. Summers, Assistant Secretary of the Agricultural Bureau, and Mr. R. W. Skevington, Manager of the Produce Export Department, have been appointed Inspectors of Fertilisers under the Fertilisers Act of 1898. All communications concerning the Fertilisers Acts should be addressed to "The Inspector of Fertilisers, Department of Agriculture, Adelaide."

The insect known as the Pied Fly bug, and in Victoria as the Rutherglen fly, is doing serious damage to fruit, especially grapes, in some districts. This small fly swarms on the fruit and extracts the juice, causing it to go bad. One grower near Melrose states that in a few days some tons of fruit were destroyed. The young shoots of various plants are also attacked by this insect, and last year in some parts they were so thick that they were gathered up in buckets-full. There is really no practical remedy for this pest owing to the wide area over which they exist, but considerable good can be done by keeping the orchard and vineyard free from all weeds and rubbish, which afford a harbor and breeding place for the flies.

When saving seed, for sowing, of any variety of sorghum, millet, or maize, be careful to select only the finest and best heads, or panicles, or cobs, equal in character. This recommendation applies to all seeds; but especially to those just named, as they are all very liable to go back to inferior sorts. The heads, etc., should be moved into a sheltered place, where they will dry slowly. The seeds can be removed from the heads of sorghums and millet by dragging them through the comb of a stripper, or a comb made by driving a number of large nails into a board—the stripper comb is by far the best. Maize seed is generally stripped from the cobs either by a tool made for the purpose, or by aid of a nail fitted on a very stout glove—this is called a "husking pin."

At least twenty acres of the best land upon each farm should be reserved for growth of green feed for the live stock. If it is thought to be unlikely that any green plants can be grown during summer and autumn, a still larger area should be cultivated during the cool season to provide silage. This land should receive all the manure that can possibly be raked together and spared for it. Wherever the soil is rich, loamy, or light and deep, it is certainly well adapted for growth of sorghums, maize, millets, kale, and several other plants, if the season just preceding has not been very dry indeed. Every farm ought to produce all the vegetables and fruit required within its own boundaries, and it should not be necessary to trust to outsiders for supplies of eggs, bacon, butter, meat, bread, or most other edibles.

There is no common-sense in using a sledge hammer to drive in a tack; and yet there are many men who throw in a deal of extra and useless labor and expense with their work. Heavy, clumsy implements and appliances are often used where others of a much lighter character would do better and quicker work, and the strength thrown away in operating with the heavy tool would perform at least double the quantity of work. The heavy clumsy horse crawls with his load, taking a whole day to perform work that would be done three times over by a lighter active animal. The horse, or cow, or other animal that has grown stiff and useless, will eat as much, and require twice the care, that would be required by a productive young animal. Sentiment would stock a farm with ancient pensioners, but common-sense would replace them with producers. Every ounce of draught beyond what is required to properly work an implement is a source of loss; every particle of food that is eaten by stock should show a return in profit; every hour of time is worth a certain sum of money; and every waste upon a farm or elsewhere detracts from profits.

With a view to provide a possible early bite of green stuff for cows, young pigs, &c., it will be worth while to harrow on the stubbles about 3lbs each of white mustard and rape seed. The area of land to be so treated should depend upon the number of domesticated animals on the farm. If early rains should occur there will be a nice show of green feed within six weeks after. By harrowing in the seed of weeds, &c., the ground can easily be cleared after the seeds have germinated, and, by ploughing the plants under, the soil will be enriched. Land should now be enriched and prepared for crops of kale, drum-head cabbage, &c. Clean seed for sowing, whatever may be the trouble in doing so. Every weed takes the place of a desirable plant, and robs at least four of its neighbors of a great portion of their nourishment.

In Queensland there are 644 artesian bores, of which sixty-two have been sunk at the public expense and 582 by private owners. Of this number, 372 have a positive pressure at the surface, fifty are not completed, and in over 200 the supply is deficient. The total number of feet bored is 717,272, equal to nearly 136 miles. The continuous flow from 376 bores is estimated at over 200,000,000 galls. daily, but many of them show a falling off in their supply.

FORESTRY.

NOTES ON PLANTING.

By WALTER GILL, F.L.S., F.R.H.S., CONSERVATOR OF FORESTS.

Treatment of Trees after Planting.

The treatment that trees receive after planting has a very great deal to do with their subsequent success or failure. One of the most important points requiring attention is the necessity for *adequate protection from all possible sources of injury*. This seems to be so clear at the first glance as to render any reference to it unnecessary, and yet, strange to say, as a matter of fact, it is a point far too often entirely neglected, or, only very indifferently attended to. If a strip of land along a boundary be planted, it will be found by far the best way, in most cases, to erect a good fence parallel with the existing one and to keep this in thorough repair till the trees are well enough developed,

with a trunk stout enough and a head high enough to be beyond the reach of any stock. Only in this way can the trees get a fair chance to grow properly, as, if the wires be not kept thoroughly well strained, cows, and calves especially, are sure to poke about them, tear them about, and eat them down constantly, dwarfing their development and spoiling their shape. Unfortunately it is not an infrequent thing to find trees that have successfully started and promised vigorous and speedy growth totally ruined in the way already stated, simply because it was too much trouble to keep the fence in order, and thus the result of much valuable labor is entirely thrown away. Wherever sheep graze in the vicinity of young trees great care must always be taken to exclude them, as they are inveterate enemies of almost all trees wherever and whenever they can reach them. Goats are even a greater source of danger than sheep, and nothing short of stout wire netting or pig netting well fastened to a wire running low to the ground as well as higher up will suffice to keep *them* at a safe distance. In cases where single trees are planted here and there over a paddock they will require guards to protect them, and little groups of a few trees will need a fence round them. It is a good plan to use rough split timber, if such be available, for the guards, giving them a good lean outwards, which will allow ample space for the branches to spread without chafing against the wooden frame as the tree gets a larger head. Many more hints might be given while on this subject, but the most suitable plan under any given circumstances will readily suggest itself to all practical planters, and the main thing to remember is that *ample protection must be given*; and if such protection cannot for any reason be given to a *considerable number* of trees, the proper way is to plant no more than can be sufficiently protected, and *get them well grown first ere trying more*.

Another point of very great importance is *proper surface cultivation* round the trees. This should receive special attention after any fall of rain in districts where the soil is stiff in its character, as such soils are particularly liable to set or cake very hard. The cultivation does not require to be deep; an inch or two of soil well loosened is ample and may be worked either by the hoe, spade, or fork, according to the nature of the ground. It has been amply demonstrated beyond doubt that loosening the soil in this way prevents the rapid evaporation of moisture, secures proper aëration of the ground, and causes all dews which may fall to be readily absorbed for the benefit of the young trees, whereas neglect of cultivation and caking of the surface results in rapid exhaustion of subsoil moisture, waste of much of the valuable dew that may fall, owing to its rapid evaporation from the hard surface, and lack of proper aëration of the soil so helpful to plant life. Should any trees be watered artificially from time to time it is imperatively necessary that the work of cultivation should follow the watering, and if this cannot be attended to the trees will in most cases do far better without any watering at all. Porous soils, of course, would not have the same tendency to cake and clog with watering, but judicious stirring of the soil is always beneficial, and well nigh everyone must be familiar with the fact that the more cabbages and other vegetables are stirred by hoeing the better they grow. Summed up briefly, however, it is far better to cultivate and not irrigate than to irrigate and not cultivate.

There is another matter which, though comparatively trivial in itself, is often responsible for failure, even when the two vital points already indicated have received every attention; this is the tying of trees to stakes. Now in connection with this work people seem quite to forget that the bark of trees, either when in its tender green stage or in its stronger and more developed state is readily liable to injury if the tree be fastened carelessly by a rough tying material to a stake with sharp edges, or in any other way at all likely to chafe it when rough and rapid motion is caused by the action of the vehement winds that so frequently

occur in this colony at certain periods. The only way to prevent injury is to use plenty of old bagging, or better still, straw bottle-covers, as packing round the bark of the tree, if it be of fair size, or if smaller, some soft woollen material or other similar stuff will do. If this be securely attached at the point where the tie presses no ill results need be feared, but it will be necessary to examine the trees now and then, as if this be not done they will cut right into the tree as it grows larger, and it is really surprising how easily this point may be forgotten even by those who are fully impressed with its importance. A practice that may be often noticed is to tie a tree, even when very young with only a tender green top to each of the four corners of its guard, and so, as it were, anchor it to the guard. This method cannot be recommended; it is very likely to end in cutting the top clean off. It is far better to have a suitable stake and tie the tree, say, twice or more if needed, as the double tie keeps it steadier than only one. Another plan frequently seen is to drive three or four short stakes round trees planted in a paddock where stock are running with a view to keep them from trampling over them. This may be economical at the start, but if these stakes are placed *too close in the first instance*, or *left too long* after the trees have grown large enough to be driven violently against them by the wind, it will prove a *dear method in the end*, as, if they are not totally destroyed, the trees will certainly be seriously checked and dwarfed in their growth.

Only lately, when examining some young trees which were planted as an ornament in a public place, I found several that had sustained much injury through injudicious tying, and one that had been completely cut in two by constant chafing, through neglect to re-tie as occasion demanded. This is but one of many instances that might readily be given to prove the importance of attention to this point in the treatment of trees after planting, which, as well as the others already noted, must claim the requisite attention if tree-planting is to be a success.

SOME INSECTS INJURIOUS TO STORED GRAIN.

There are quite a large number of insects which live upon grain and meal, either in the larval or perfect conditions, and some of them continue the attack in all stages of their life. There are two weevils (or snout beetles) which are very common in most countries, having been distributed along with cereals. As they breed continuously and very prolifically, they are capable of doing a great deal of damage to stored grain within a remarkably short time. These are named respectively "the granary weevil" (*Calandra granaria*) and "the rice weevil" (*Calandra oryza*). They are very much alike, and neither is more than one-sixth of an inch in length, are rather flattish, and brown in color. The head is prolonged into a snout, and the antennæ, or "horns," are elbowed and attached to the middle of the snout. The female in each case punctures the grain with her jaws, which are on the end of the snout, and deposits a minute egg there, which in a short time produces a grub. This grub eats the mealy interior. In wheat or rice only one egg is deposited; but in maize two or three grubs will find sustenance. The grain weevil is much lighter brown than that which attacks rice. Both weevils will live upon rice, wheat, barley, oats, maize, buckwheat, Kaffir corn, sorghums, and other grain, and often attack biscuits, cakes, &c. There are three or four beetles, belonging to genera other than the weevils, which attack grain, pulse and other seeds, and five or six beetles which attack flour, meal, and the like. The chief of the other grain beetles are the saw-toothed grain beetle (*Silvanus surinamen-sis*), the red or square-necked grain beetle (*Cathartus gemellatus*), and another called *Cathartus advena*. Amongst the flour and meal beetles are the confused flour beetle

(*Tribolium confusum*), the rust-red flour beetle (*Tribolium ferrugineum*), the slender-horned flour beetle (*Echocerus manilosus*), the broad-horned flour beetle (*Echocerus cornutus*), and the small-eyed flour beetle (*Palorus ratzeburgi*). Then there are a couple of beetles, the larvæ of which live chiefly upon neglected meal bins, ship biscuits, &c. These beetles are *Tenebrio molitor* and *T. obscurus*. They seldom do much mischief, and the large grubs are sought after by bird fanciers. The former grub is bright yellow in color, with dark-brown head and rings of the segments; the other is much darker in color.

In addition to the various beetles there are several moths, the caterpillars of which are destructive of flour, meal, and grain. The most dangerous probably is the flour moth (*Ephestia kuehniella*) which often gets into flour mills. Then there exist the Indian meal moth (*Plodia interpunctella*), the meal snout moth (*Pyralis farinalis*) and one or two others. There is a largish beetle, called the "Cadelle" (*Tenebroides mauritanicus*), which attacks meal and grain, but at the same time preys upon all other insects it comes across, which partly compensates for any mischief it may cause to the stored grain or meal.

In the valuable Bulletin, No. 45, 1897, by F. H. Chittenden, Assistant Entomologist to the U.S. Department of Agriculture, full descriptions of the above insects, with enlarged illustrations, are given. Several of the pests have already reached South Australia, and it behoves millers, wheatbuyers, seedsmen, and others to maintain a constant lookout for their appearance, and take the most vigorous steps for extirpation if found. The Mediterranean flour moth (*Ephestia kuehniella*) is a particularly dangerous enemy, and can only be destroyed by the most costly plan of completely emptying the mill or warehouse, taking down of all woodwork, steam-spraying every inch of interior and probably exterior surface, substitution of metal spouting and metal partitions, &c., wherever possible, together with many other precautions.

The Bisulphide of Carbon Treatment.

The simplest, most effective, and inexpensive remedy for all insects that affect stored cereal and other products is the bisulphide of carbon, a colorless liquid with a strong, disagreeable odor, which, however, soon passes away. It vaporises abundantly at ordinary temperatures, is highly inflammable, and is a powerful poison.

It may be applied directly to infested grain or seed without injury to its edible or germinative principles by spraying or pouring, but the most effective manner of its application in moderately tight bins or other receptacles consists in evaporating the liquid in shallow dishes or pans, or on bits of cloth or cotton waste distributed about on the surface of the infested material. The liquid rapidly volatilises, and being heavier than air descends and permeates the mass of grain, killing all insects and other vermin present.

The bisulphide is usually evaporated in vessels containing $\frac{1}{2}$ lb. or $\frac{1}{4}$ lb. each, and is applied in tight bins at the rate of 1 lb. to $1\frac{1}{2}$ lbs to the ton of grain, and in more open bins a larger quantity is used. For smaller masses of grain or other material 1 oz. is evaporated to every 100 lbs. of the infested matter. Bins may be rendered nearly air-tight by covering with cloths, blankets, or canvas.

Infested grain is generally subjected to the bisulphide treatment for twenty-four hours, but may be exposed much longer without harming it for milling purposes. If not exposed for more than thirty-six hours its germinating power will not be impaired. In open cribs and badly-infested buildings it may sometimes be necessary to use a double quantity of the reagent and repeat treatment at intervals of about six weeks during the warmest weather.

Mr. H. E. Weed, Entomologist of the Mississippi Experiment Station, claims that 1 lb. to 100 bush. of grain is amply sufficient to destroy all insects, even in open cribs.

Mills and other buildings, when found to be infested throughout, may be thoroughly fumigated and rid of insects by a liberal use of the same chemical. A good time for this work is during the daylight on a Saturday afternoon or early Sunday morning, closing the doors and windows as tightly as possible and observing the precaution of stationing a watchman without to prevent anyone from entering. It is best to begin in the lowest story and work upward, to escape the settling gas. The building should then be thoroughly aired and the grain stirred early Monday morning.

For the fumigation of a building or a reasonably close room it is customary to evaporate 1lb. of the bisulphide for every 1,000ft. of cubic space. In comparatively empty rooms, and in such as do not admit of being tightly closed, two or three times the above quantity of the chemical is sometimes necessary.

Certain precautions should always be observed. The vapor of bisulphide is deadly to all forms of animal life if inhaled in sufficient quantity, but there is no danger in inhaling a small amount. The vapor is inflammable, but with proper care that no fire of any kind, as, for example, a lighted cigar, be brought into the vicinity until the fumes have entirely passed away, no trouble will be experienced.

Summary of Principal Remedies and Preventives.

The bisulphide of carbon by reason of its intensive action is the best known remedy against all insects that affect stored products, and for this purpose is becoming indispensable, but in addition to its use various other measures, principally preventive, may be observed with profit for the preservation of grain against insect attack. The principal co-ordinate or additional measures may be summarised as follows:—

1. Prompt thrashing to prevent the Angoumois grain moth, rice weevil, and some other species from obtaining access to the granary.
2. Inspection, quarantining, and disinfection of infested or suspected grain, bags, and machinery before permanent storage.
3. Scrupulous cleanliness, including the prompt destruction of refuse material, which will accomplish much in lessening the chances of injury.
4. Constructing or refitting the warehouse or mill, especially in warm latitudes, with a view to the exclusion of insects.
5. Substitution of metal for wooden spouts, &c., and the use of other improved machinery in mills infested with the flour moth.
6. Storage in large bulk, particularly valuable against grain moths.
7. Storage in a cool, dry repository, well ventilated to prevent "heating."
8. The use of naphthaline as a preservative of small samples in tight receptacles.

HORSE-BREEDING IN ITALY.—The Government of Italy maintains seven stallion depôts, in which last year there were 557 stallions. These stallions, in the breeding season, were distributed over 378 stations, and served at these stations during last year 20,797 mares. Besides the stallions of the Government depôts, others are used; but these "outside stallions" must be "approved" or "authorised" before they can serve. They have to pass an examination before the "horse commission" of the district in which they are wanted to stand, and if they fail to pass the examination they are not allowed to be used for stud purposes. During 1896, 816 "outside" stallions were submitted for examination, and of these 683 were passed. These 683 authorised "outside stallions" served 18,022 mares, making, with the 20,797 above mentioned, a total of 38,819 mares served during the year, all by approved stallions.

ANNUAL REPORT OF DEPARTMENT OF AGRICULTURE.

The following items are extracted from the annual reports of Professors Lowrie and Perkins to the Hon. Minister of Agriculture:—

THE COLLEGE FARM.

The total rainfall for 1896 was 14in., and we hoped we touched in that year a minimum for some years to come. We were, therefore, much chagrined to find the rainfall of 1897 fall still lower. I give it here in detail, with the view of showing that our efforts could be of but relatively little avail in the face of such adverse conditions.

	Inches—1897.		Inches—1897.
January.....	0·245	August	2·553
February	0·545	September	1·633
March	0·315	October	0·080
April	0·745	November	0·467
May	1·870	December	0·056
June	1·485		
July	2·162	Total	<u>12·156</u>

With this rainfall it will be needless to inform such as have a knowledge of farming that nothing except wheat succeeded, and that even that crop, in spite of its outstanding and pertinacious vitality, was much limited by the rainfall. I consider it needless to detail all the failures, and content myself by saying that everything failed with the exception of wheat, but that, luckily, in the knowledge of the preceding dry season, and the recognition of the adverse weather at seed time, we almost confined our operations to cereals—wheat, barley, and oats. Oats failed outright, and barley yielded only about 8bush. per acre; but wheat, considering the conditions, far surpassed our anticipations. A saving grace was offered also in the good prices to be obtained for hay and wheat, and the year's operations proved not so bad financially as we feared, and our revenue almost maintained its average figures.

I will give here the detail of results. We cut about two-thirds of the area for hay, and the different fields returned from 15cwts. to 38cwts. per acre, as near as we could estimate the yield, according to the land and the manure used.

WHEAT.

	FIELD No. 6A.	Bushels per Acre.
After oats		15·5
After peas, manured with 2cwts. per acre of superphosphate guano.....		18·2
“ unmanured		15·5
“ unmanured, but the wheat directly manured with 2cwts. per acre of Abrolhos guano		18·86
After bare fallow and unmanured		15·0

These blocks were sown with King's wheat. The land was worked and sown after the rains at the end of May, and the seed went into a beautiful seed bed. Had we delayed seeding in the other fields, and had it been practicable to have done so till after that rain, the yields would have been better all round. But it is easy to be wise after the event. We sowed dry when the season had so far advanced that there was risk if the winter setting in with heavy rains that we might not be able to get on the land to finish operations.

A block of Medeah in this field also yielded 15bush. per acre. This was after beans, which had been manured heavily with farmyard manure.

FIELD No. 16.

Early Para	10bush. per acre
King's wheat	7bush. 20lbs. per acre

This is the poorest land by far in the College farm, and was manured lightly with about 1cwt. per acre of Kangaroo Island guano. It is light brashy land in the extreme, and part of it is a drifting sandhill.

A block of barley in this field yielded very miserably—only about two bags per acre.

FIELD No. 4.

In this field the experimental work was carried out on blocks of five acres. The remainder, about eighty acres, was manured with 2cwts. per acre of Kangaroo Island guano and was cut for hay, with an average yield of about one and a half tons per acre. The experimental work was as follows:—

I. BROADCAST V. DRILLING.—KING'S WHEAT (FIVE-ACRE BLOCKS).

[Manure—2cwts. superphosphate and $\frac{1}{2}$ cwt. sulphate of ammonia.]

	Bushels per Acre
Plot No. 1. Seed and manure drilled	18·14
“ 2. Seed and manure broadcast	16·37
“ 3. Seed drilled and manure broadcast	14·00

As the season opened with very light rains, which brought away the wheat near the surface, there was an advantage in favor of the broadcasted crop which does not occur in average seasons. The results, however, on the whole confirm conclusions derived from former experiments, that drilling the seed and manure together is the best practice. I do not consider, however, that the manure used gave much additional yield compared with what would have been reaped without it. This indeed is evident from the results of the manure tests detailed below, where it will be noticed that with the exception of a plot dressed with superphosphate alone the manured plots yielded less than that unmanured. The whole field carried wheat in 1895, and the greater part of it was manured then in a direction at right angles to the direction in which the plots were laid out in 1897, and the residual value of the manure, although it was chiefly superphosphate that was used, accounted for the crop more than the manures applied in the season.

II. MANURE TESTS.—KING'S WHEAT (FIVE-ACRE BLOCKS).

	Bushels per Acre.
Plot No. 1. Manured with 4cwts. basic slag per acre	16·23
“ 2. “ 2cwts. basic slag per acre	15·58
“ 3. “ 3 $\frac{1}{2}$ cwts. Kangaroo Island guano per acre ..	15·34
“ 4. “ 2cwts. super-phosphate per acre	21·56
“ 5. “ 2cwts. Kangaroo Island guano per acre,	
$\frac{1}{2}$ cwts. sulphate of ammonia per acre	12·53
“ 6. “ 90lbs. muriate of potash, 180lbs. guano,	
68lbs. sulphate of ammonia per acre	12·26
“ 7. “ 2cwts. bonedust per acre	16·18
“ 8. “ No manure	18·45
“ 9. “ 2cwts. basic slag, 2cwts. kainit per acre ..	17·59
“ 10. “ 2cwts. muriate of potash per acre	12·52

I trust these results will not be interpreted to mean that manuring is not remunerative. We have never before had results so contradictory, and they are no doubt to be accounted for by the exigencies of the season. I have said already that it opened with a very light rain, and the seed was buried rather deeply for the season, so that the plants came thinly, and some of the seed malted. The germination, I noticed also, was thinner in the plots dressed with muriate of potash and sulphate of ammonia. I have a suspicion that

these manures in some way injured the seed, struggling as it was between malting and germination proper. At any rate the braid was much thinner and weaker. Had we had 4in. more rain I am absolutely confident that we would have read a very different story in the returns from these plots. It is at least satisfactory that the manure should yield such evidence of its value on the succeeding crop of wheat. The unmanured land in the same field in a better season, when it was last in crop, only yielded 12bush. per acre. The field is fallowed this year, and I anticipate that in 1899, when it will be again in wheat, these blocks, sown without manure, will reveal interesting results. I mean to have them reaped separately and the yields measured as a means of testing the residual values of the different dressings.

1.—THE EXTENSION OF THE USE OF ARTIFICIAL MANURES AND A MORE INTELLIGENT APPLICATION OF THEM.

I am happy to be able to say that farmers are rapidly adopting the use of artificial manures, and many are now assured of the financial advantages which attend their use. Years ago I was convinced by experience on the College farm that it was practicable to restore the exhausted wheat lands of the colony by this means, and that it could be done with considerably augmented profits. Were the use of manures merely a means of increasing the returns of agricultural produce, while the clear profits remained as heretofore, the indirect gain to the colony would be very considerable from, for example, increased railway returns, increased employment of labor, and increase in the volume and interchange of money; but when it has been demonstrated that not only can the land be so replenished as to yield returns comparable to those obtained one or more generations ago, when the land was rich in its virgin wealth, and that this can be done with increased attendant profit to the farmer, the general adoption cannot be long delayed. Land values have firmed very appreciably lately, partly no doubt as the result of the cheapness of money: but when we bear in mind that this firming has been evidenced in the face of the most severe and prolonged drought the colony has experienced, one must look to some other cause than the low rate of interest to account for the development. It is, I take it, that investors are satisfied that the day of exhaustion of our wheat lands has passed; that in the face of adverse conditions unsurpassed remunerative crops can be grown over the lands subject to an average rainfall of 15in. to 16in. or even less; and that with the return of the average season of past cycles, the use of artificial manures will expand the returns from the land safely and surely. In the foregoing College report in which the returns of wheat from a rainfall for the year of 12in. are detailed, there is some evidence that manures may be profitably used on country with even a lower average than that instanced above.

In the full conviction that no innovation in the practice of wheat-growing is so pregnant of advantage to the farmer as the introduction of the drill and the use of artificial manures, I have in season and out of season advocated this matter. At first all manner of objections were advanced: that the climate was too dry, and that manures would result in the blighting of the forced crop when the dry season set in; that artificial manures were too expensive, and their use would not be remunerative; and that rust would affect a manured crop more seriously than one which had not been manured. But it has been shown that phosphatic manures do not lead to a crop being blighted in the same way as when it has been dressed with nitrogenous manure or when the land has been dressed shortly before the crop was sown with farmyard manure; that as the extension of the use of manures proceeded, the price has been reduced and superphosphate is offered now for £2 per ton less than was quoted three or four years ago; and that although the objection that heavy crops

forced with artificial manures are more liable to rust, or are affected more seriously, still holds, much can be done to lessen the loss from even this cause. There are still many farmers in the colony who have curious ill-defined suspicions that the use of manures will ultimately ruin the land for wheat-growing. These manures, they say, are simply stimulants, and will leave the land exhausted beyond measure, capable of growing neither wheat nor feed. They can point to no instances, but nevertheless cherish the suspicion and hesitate to try the manures. They forget that though artificial manures are only being introduced here they have been in use for more than half the century in more highly farmed countries, and with results, when judiciously used, ever satisfactory. That manures should be spoken of as *exhaustive* is practically a contradiction in terms. It has been again and again pointed out that the continued use of manures with only one or two manurial constituents may bring about a condition of things that the land will not respond to these manures and is apparently ruined, but this result is only the effect of increasing the return for a time and reaping heavy yields by the use of, say, nitrogenous manures alone. The available phosphates will naturally have been exhausted sooner than would otherwise have been the case, but the remedy is at once suggested—manure rationally and apply that in particular in which the land is more exhausted, in this case phosphates. The continued use of phosphatic manures, on the other hand, does not bring about the exhaustion of nitrogen in this climate so readily as nitrogenous manures the exhaustion of phosphates; but it will be understood that after the continued use of phosphatic manure alone for a succession of crops nitrogenous manures will be found necessary. When that condition is brought about a blend of nitrogenous and phosphatic manures becomes desirable, and experience will readily point out the relative proportions in which the two substances should be mixed: each farmer can discover for himself by having one or two turns of the drill in each field as it comes into crop in rotation manured with phosphates alone and with blends of phosphatic and nitrogenous manures in different proportions. The crop on these plots will readily point out the mixture (if any) most remunerative. Again, the use of even a mixture of nitrogenous and phosphatic manures may fail to make the land sufficiently responsive; in that case the available potash is likely to have become deficient, and the remedy will evidently be to add a certain weight of a potassic salt to the mixture, according to the condition of things prevailing and the character of the cropping. To the man who understands the principles and the practice of cropping, there is no occasion for sickly forebodings on this score. He is satisfied that while the increased returns remunerate him for the immediate expenditure on manures, he has everything to gain and nothing to lose; his crops continue heavy, his land improves in heart or maintains its conditions, and his feed when the fields lie out carries more stock. Exhaustion in any farm by manuring is really a myth; it is a condition arising from ignorance in the use of manures rather than from any inherent stimulating action of the manures. As experience of manures is gained and evidence of the financial advantage of their use is increased, we will hear less and less of this bogey. I take it that the use of the drill and artificial manures now so rapidly extending is the greatest improvement which our practice of agriculture has witnessed for many years; it has been estimated that upwards of £70,000 value of artificial manures has been used in the colony during the past year. This will mean at the least an increase in our returns in one form or another to the amount of £110,000 to £130,000, or thereabout, a very appreciable increase relative to the total value of our produce.

In my lectures I have urged farmers to use almost universally in the first place phosphatic manures, for I believe we have evidence that nitrogenous

manures are not relatively to phosphatic manures so important for cereal crops in this colony as in some other countries. The explanation seems to me to be found—

- (a) In our regular practice of fallowing :
- (b) In the more rapid nitrification occurring in our soils :
- (c) In our habit of taking only the grain and allowing the straw to be consumed or to rot on the land ; and
- (d) In the light rainfall, which renders under drainage unnecessary, thereby avoiding the leaching of nitrates.

Of the phosphatic manures, bonedust will be found, in districts where less lime is present and the rainfall fairly heavy, a profitable form to use. On limestone soils and in the drier districts superphosphate, or at least soluble phosphates, give the best result. Many farmers who use these manures appear to have an exaggerated notion of the value of light dressings, and I think err in applying as little as from 40lbs. up to 80lbs. of superphosphate to the acre. They would be better advised to apply from 1½cwt. up to 2cwts. to the acre, the amount varying according to the rainfall of the district. In our hills districts as much as 3cwts. could, I think, be profitably used. There is not much advantage in drilling compared with broadcasting when no manures are used, and broadcasting is more expeditious. It is of the very utmost importance to get the seed in early when the weather allows of it. By applying the manure more heavily a less area would need to be drilled, and the remainder could be broadcasted to expedite the seeding ; but where such light dressings are used the whole area has to be gone over with the drill, and the few days later in seeding may counteract such advantages as might be gained from such a light dressing.

2.—MORE ATTENTION TO SHEEP.

In former reports occasion has been taken to refer with satisfaction to increase in appreciation of the value of sheep. There is still a large percentage of the farmers, however, whose country is not yet sheep-proofed, and it is unfortunate for themselves and for the colony that they are so slow to take advantage of this useful means of increasing the returns to the farm. There is no question whatever that sheep are, generally speaking, the class of stock which can with most advantage be associated with our wheat-growing, and every farmer who is not engaged in dairying, except perhaps a few working on land without permanent water, or where water cannot be conserved in dams, or where the area of land occupied is very small, should undoubtedly have a flock of sheep of some form or other. This subject has been urged unfailingly, as there is ample assurance that there is much to be gained by adding sheep to the stock on the farm. I would set down these as some of the advantages associated with the combination of sheep-farming with wheat-growing :—

- (a) They are a valuable assistance in keeping the land clean. There are times when other operations so engage the attention of the farmer that he cannot spare his teams to clean off weeds which may be running to seed on his fallows. In harvest time, for example, stray wild oats, cockspur, and other weeds, which sheep nip off, run into seed on the fallows ; the harvest work cannot readily be postponed to scarify these off, but sheep turned in will nip off the oats, &c., in a manner that will largely prevent the seeding of the land. For those men who crop once in three years, sheep are more valuable than any form of stock to feed bare in the early spring and summer those fields that are to be fallowed in the succeeding year. To allow the herbage to grow rank and to seed is to increase the difficulty of cleaning by the fallowing.

- (b) Sheep are very handy, in fact no other class of stock can be used, to feed off an early sown crop that is becoming proud.
- (c) They make better use of stubbles, licking up the flag which may have fallen, gathering up much of the bottom herbage, and consuming some of the straw. If there be water in the paddock, it is really astonishing how well sheep will do on stubbles until the autumn rains come. I believe it is possible to carry up to two-thirds the number of sheep on a farm where wheat is grown on the land once in three years that could be carried on it were it only devoted to pasture.
- (d) Saving the butcher's bill.

While these indirect advantages arise from keeping sheep on the farm, there is at the same time direct financial gain of considerable importance. Very little labor is absorbed in attending to the sheep, and a very useful cheque is returned for wool and for fat lambs when they can be grown or for fat draft sheep. The effect of the Produce Export Depôt has, during this year, given great relief to the fat lamb market and kept up the price of lambs, and there is good reason to hope that the export will increase rather than decrease. It will be well therefore for farmers to keep this opening in view when determining the class of stock to keep. On farms, generally speaking, it will be found good practice to breed cross-bred lambs. A farmer with a small area cannot to any advantage keep a breeding flock properly so called. With Merino sheep he may do well enough by buying or renting his rams and breeding his ewes, but it seems to be better practice to buy ewes where opportunity offers off the shears; well-bred old ewes with good mouths and good size and conformation can often be picked up off the stations at shearing time. On these English rams should be used and a cross-bred lamb bred from them. The farmer thus gets the lamb and the fleece for the keep of the ewe, and he may often have the luck to sell the ewes, provided they are in good condition, for as much or almost as much as he gave for them. There is some indefiniteness as to the best breed of rams for the farmer to use; some advocate Lincoln, others Shropshire, and others again South Down or Dorset Horn. I cannot say, however, from the farmers' point of view, that there is much in favor of the Lincoln. If it is his purpose to keep the lambs until fully matured he will, of course, get a heavier fleece on the wethers and a bigger sheep, but few farmers will do this; the great majority will sell their cross-bred lambs as soon as they are ready, and therefore the best practice undoubtedly is to use one of the early-maturing breeds.

The South Down gives a more shapely lamb, which matures as quickly, or more quickly, than that from any other breed; but I believe it will be better for farmers to breed this lamb pure bred rather than to cross it with the Merinos, as the cross-bred lamb, though very taking in appearance, is rather small. The Shropshire for crossing with the Merino seems to me to have everything in its favor; it is as shapely, or almost as shapely, as the South Down; it matures sufficiently early for all practical purposes. With the South Down it has the advantage that the head is small, and the ewes lamb more easily than when bearing crossbred Lincoln lambs, and if the lambs be kept on for one or two years it gives a better cross-bred fleece than the South Down. The drawback hitherto to the use of that breed has been the cost of the rams, but no doubt as the breeding flocks increase it will be possible to obtain the rams as cheaply as Lincolns may now be had. The Dorset Horn sheep, lately imported by Mr. Melrose, will, I think, be found admirably suited for crossing with the Merino. Mr. Melrose presented a Shearling ram to the College farm last year which we used on Merino ewes with what we thought very marked success. The cross-bred wool was of high quality, and the lambs did remarkably well.

At five months old we selected ten of them and had them weighed, and the average live weight was 97lbs.; the average weight of the Merino lambs from the same flock was 75lbs. These Dorset Horn crosses, it will be seen, were ready for the market at under four months old. I would consider it a very fair subject for departmental inquiry, and an inquiry which might yield useful results to the colony, to test side by side the different breeds of sheep available in the colony to cross-breed with the Merino. Were the College farm sufficiently large to carry a flock of 2,000 ewes this would certainly be one of the matters which I should have to recommend for consideration.

We could compare the returns from the different breeds: (1) from fat lambs; (2) from wool as lambs—2-tooths, 4-tooths, and 6-tooths, as the case might be; (3) their average live weights at different ages; and (4) their market values from time to time by selling on the same day drafts from the different cross-breeds. Tests such as these, I think, would help to remove the uncertainty which now prevails as to relative merits of the different breeds for cross-breeding, and to place the whole subject of cross-breeding more in line with other features of the management of sheep.

Though there is this indefiniteness as to the best practice for farmers to pursue in relation to the cross-breeding of sheep, there is no question that the gain to the colony would be very considerable if all farmers could be induced to sheep-proof their country and keep sheep. In the hills districts and in the more favored tracts dairying is likely to prevail, more especially in farms where the farmer's family is sufficient to overtake the labor which dairy stock entails, but in the drier and less favored districts I cannot see that any practice is likely to lead to better results than wheat-growing combined with sheep-farming, and both conducted with skill.

3.—IMPROVEMENTS IN OUR PRACTICE OF WHEAT-GROWING OTHER THAN THE USE OF MANURES.

In lecturing in the country, while the extension of some of the improvements more lately introduced had of course first attention, other matters which have been adopted in the practice of the best farmers for many years were brought prominently under the attention of those less advanced in the practice. Some of these may be enumerated.

- (a) The importance of bare-fallowing and of having the land lifted early in the season. The average rainfall of one year over the greater proportion of our wheat-growing country is not sufficient to bring about a fair yield of wheat, and bare-fallowing was pointed out as a means of eking out the moisture of the preceding year for the advantage of the crop to the extent of 3in. or 4in. of additional rain while the crop was growing. Compared with this advantage of bare-fallowing, the others, such as the cleaning of the land, the improving of the land in the rendering available of plant food and the facility for early seeding, are dwarfed in importance.
- (b) The avoiding of the working of the land when it is dry. There is good evidence that the failure of wheat from what is known as take-all can, in the majority of instances, be referred to injudicious working of the land—over-working the fallows, and working the land when it is dry. Sowing light lands, dry also, is detrimental to the yields, as there is difficulty in getting the soil sufficiently consolidated for the best results from wheat. The advantage of an occasional crop of oats in preventing take-all was also urged.
- (c) The regular change of seed and careful observation of the districts from which changes of seed give the best results. Two bushels to the acre will frequently not measure the gain from a change of seed.

- (d) Most careful selection of seed according to the soil and the climate. Any man who grows a few varieties of wheat each year will speedily become convinced of the great importance of securing the wheats best adapted for his conditions. One can scarcely credit that there should be amongst us, even at this day, men making a living from the growing of wheat who do not know the variety they sow, or, when they do buy a variety, have no notion whether it is true to name. The difference between the returns of two varieties of wheat under the same conditions will often be found sufficient to pay the rent of the land twice over, or the interest on the value of the land. This selection of seed wheat should be carried out in full knowledge of the contingencies which may possibly arise. Early wheats should be favored for some districts; late wheats for others. A proportion at least should be sown with wheats likely to escape or to resist with more success the ravages of rust. In this connection I may refer to the importance to the colony of encouraging the wheats likely to give the most valuable flour. Some people have the belief, on what appears to me very good evidence, that the quality of our flour, considered in its bread-yielding capacity and in its nutritive value, is losing ground. How far this arises from the greater degree of exhaustion of our soils, or from the persistence with which our wheatbuyers encourage the larger-berried soft white varieties of wheat and boycott the darker or less bright and smaller-berried varieties, or from our practice of allowing the wheat to stand until it is dead ripe, and more than ripe for the stripper, one cannot readily say. The importance of testing the wheats, or rather the value to the baker of the flour from different wheats, should, I think, be recognised in our departmental work. When evidence is forthcoming of the value of different wheats in this relation, other things being equal or nearly equal, it will be to the advantage of the farming interest to grow those varieties likely to yield the best flour. Useful work has been done, and is being continued by the chemist of the Agricultural Department in New South Wales, and it will be well to have similar work undertaken in this colony, for the difference of climate may bring about different results.
- (e) The cultivation of fallow crops when practicable. Crops such as sorghum can in average seasons be widely grown over the colony, and a limited area of the fallows should, I think, be invariably sown with sorghum. It may fail, and will fail more or less frequently, but not so often as it will succeed. It will hurt the succeeding wheat crop in dry districts, but when fed down it will often benefit the succeeding wheat crop in the better districts. Maize, mangels, and kale can be profitably grown in the hills districts, and are worthy of more attention than they receive.
- (f) Rotation of crops in those districts of capacity and climatic conditions sufficient to warrant the practice. In the drier districts the farmer is undoubtedly limited to wheat, and wheat only, and on our average farming lands very little variety in cropping is practicable, but in the hills districts peas, at least, may be profitably alternated with wheat to the advantage of the land and the succeeding wheat crop. It is in these districts that expensive nitrogenous manures are most required, and the growing of peas—a profitable crop in itself—is a means of lessening the outlay for such manures. Lucern has much too little attention in the better districts. It would seem as if the value of this plant is only now being realised. From evidence of its success at Willowie, Gladstone, Georgetown, Adelaide district, even

at Blyth, and elsewhere, there is a good reason to believe that this crop can be successfully cultivated in judiciously-selected blocks over a wide area. Often very little expense will suffice to have a flat irrigated from a neighboring creek, and in many parts it will thrive well without irrigation. No crop comes near lucern for its yield of forage; no crop we can grow will approach halfway to the full return of nutritive material it will give under favorable conditions; and no crop can, I think, be more justifiably urged on the attention of farmers who may have the good fortune to have land that will carry it. In many cases where the water from a creek could be profitably used the deflection of any part of the water is objected to by the land proprietors situated lower down, but as a rule as much water as can be wished can be deflected during the winter and spring without demur, and it will often be found possible by saturating the land in winter and spring, without, of course, flooding it to the extent of water-logging or scouring, will enable the owner to grow heavy luxuriant lucern well through the summer. It is certainly well worth the trial, and, I believe, most who do give the practice a fair trial will be well satisfied of its advantages.

IMPLEMENTS.

South Australia, I think, is fortunate in the way the implement-makers have risen to the occasion and brought out implements, more especially for the cultivation of the land, adapted to the circumstances. The light multiple-furrow plough, stump jumper or fixed, is rapidly being introduced, and it is well. Many of our leading farmers are dispensing with their scarifiers in favor of light five, six, or even seven furrow ploughs, and are satisfied that they get a better seed bed by their use. On lands where the daudclion or Cape weed is plentiful they will be found far superior to the scarifier as a means of cleaning the fallows in autumn, and, indeed, wherever there is a growth of vegetation fairly established, and especially in damp weather, the scarifier is not in it with them.

For working fallows in the spring they are also admirably suited. To dispense with the heavy ploughs altogether would be a mistake. Although wheat does not require deep cultivation immediately preceding it it is well to have a part of the fallow in each year ploughed deeply, say the first three weeks fallowing, so that during each few years the plough pan may be burst up and the land opened. In countries where root crops are grown the stubbles are always ploughed very deeply preparatory to these root crops, but as such crops cannot be grown here it is well, even although the wheat immediately following the deep cultivation may suffer a little, to have part of the land lifted each year ploughed deeply. There is room for improvement yet in our ordinary three-furrow ploughs. The plough, as we understand it now, is, we must bear in mind, the evolution of the last hundred years. Progress in its improvement has been rapid, but the last word is not yet said. Colonial makers have adhered more or less closely to the Wilkie mouldboard, Americans have followed more the Small pattern. I am inclined to the belief that for our purpose the American or concave mouldboard is to be preferred. The English or colonial mouldboard—the modern development of Wilkie's old pattern—turns the furrow more or less unbroken, and is more in accordance with the principles of mechanics in so far as it is a long thin wedge with the twist of the mouldboard slightly convex. Other things being equal, it should require less power as draught, and in strong lands and wet lands will probably still be found the better form. But the American or concave mouldboard seems better suited for our purpose. The short mouldboard, concave and set at an

obtuse angle, works like a thick wedge, and may require more power, but it combines the work of a plough and a cultivator, as the furrow slice, in being turned, is bent sharply back and broken. Their work is distinctly, I think, superior on light or medium soils, as the work is left level and broken, and the land is not only turned but is "tilthed," to a certain extent, at the same operation. The draught is not greater, or at least is not increased to the degree that might be anticipated from merely examining the plough, as there is more design and substitution of channel iron or angle iron or steel for rectangular heavy-weight bars and the mouldboards are so beautifully chilled that they take on a perfect polish and reduce the friction. It is a matter of no importance to us in most parts of this colony that one furrow should be tightly squeezed over another, so as to blind weeds or vegetation, as the dry weather kills such readily enough at most seasons and to prevent seed being too deeply buried, as we never sow on the plough furrow. Accordingly I anticipate that the concave mouldboard will ultimately replace the convex shape over the greater part of our agricultural areas.

Harrows.—There is much room for improvement, I believe, in the design and make of harrows as we see them turned out among us now. If blacksmiths had to work their harrows no doubt we would soon have improvements. The most serious defects, it seems to me, are the shape of the tine and the mode of fastening it to the frame. The square tine is a mistake, and the same weight of iron flat and set edgewise to the work will be stronger and will cut through the ground more easily. The top of the tine is screwed to be fixed by a nut—another bad feature, for the nuts are forever shaking loose and tines every now and again are lost—and the tine further is made small at the neck, where, if possible, it should be stronger. The square cut shoulder where it is inserted in the frame weakens the frame at that point, with the result that harrows too frequently break either at the neck of the tine or the frame breaks where the tine is inserted. It is of course possible to make the harrows sufficiently strong even as generally designed, but they are then excessively heavy. If angle or channel iron or steel frames and flat tines were more general, and the screwed neck and nut as a mode of fastening were abolished, the gain to farmers would be appreciable. I have instanced ploughs and harrows as improvements concerning the design and material of which there is much uncertainty relative to their suitability for our conditions. As with these so it is with other implements, and we feel seriously the want of thorough systematic trials of implements such as are conducted, for example, by the Royal Agricultural Society of England. We have in the colony from year to year trials of a kind, and those conducted by the district bureaus on the Peninsula are probably the most worthy that have yet been undertaken; but a trial more elaborate and more determinate, conducted by a committee of farmers advised by an engineer, is badly wanted. I would recommend that the Government devote, say, £120 each year for such a trial of one or other of the more important farm implements. The money could be voted as a bonus to the Royal Agricultural Society on the conditions that it will hold such an elaborate trial and that one of the judges appointed be a trained engineer. Part of this vote could be used to cover the expenses of the trial and the remainder devoted as first and second prizes to the successful competitors. Arrangements could be made at the College farm for the annual trial at the time of the year most suitable for it, and the society should determine from year to year to which particular implement the trial would be devoted; thus for any one implement a considerable number of years might elapse between one trial and the next, and I see no reasons for having such trials too frequently. Trials as they have been conducted in the past in too many instances are simply make-believes, and are apt to mislead such as put any trust in the result.

VITICULTURE.

PRESENT POSITION OF VINE-GROWING IN THE COLONY.

In former reports, whilst referring to the same subject, I have had occasion to draw attention to the anomalous division of labor obtaining in South Australian vine-growing; I refer to the divorce of vine-growing from wine-making, and the creation of two separate classes with antagonistic interests—vinegrowers on the one hand, winemakers on the other. Brought into existence by the patriotic thought of those who first sought to acclimatise what they foresaw would in time prove a most profitable national industry, it has been perpetuated by the necessity of being able to command relatively large capital that wine-making in these colonies always implies, and finally so consecrated by custom that, though it now successfully holds in check any further progress of the industry, in the eyes of many it stands as an arrangement that cannot be improved upon. I have pointed out that by reason of this unfortunate state of affairs the growers' profits are rapidly receding to vanishing point; that at the expense of their yields, and consequently to the detriment of the community at large, hundreds of acres of vines are badly and insufficiently cultivated; that in some instances flourishing vineyards on which much time and money have been spent have been uprooted, reverting to wheat, which now proves more profitable; and finally that the expansion of our vineyard area, so important a feature a few years ago, has practically come to a standstill. Nothing has been changed; what was true three years ago remains true to-day, and what I said then I can only repeat to-day with additional emphasis. To those who are well possessed of the question, any further detailed statement of the general position will naturally appear tedious and perhaps unnecessary: it is probable too, that had not recent events both here and in Victoria opened up a new vista of possibilities, I would have limited myself to a brief summary of what I have previously had occasion to say on the subject. As things stand, however, urged on by new hopes of success, I am determined, for the benefit of the uninstructed, to risk incurring the blame of those who know by re-opening the whole question in detail.

I have said that through the force of circumstances our vine-growing industry, after a brief period of remarkable expansion, has practically come to a dead standstill; and, further, that it is so trammelled with artificial shackles that unaided it cannot extricate itself from a difficult position. When a request for more than passive sympathy is urged, it is as well at the outset to make clear the deserts of the petitioner; to show, therefore, that were it only from a selfish business point of view, it would be to the interest of the community at large to tender temporary aid to a deserving industry will be my first object. On the complete adaptability of the vine to our climate and soils it is unnecessary to dwell; in our midst living examples speak in language that admits of no misconstruction. On the other hand, it will be taken for granted that any industry that tends to raise the revenue-yielding properties of a soil is of direct benefit to the community in the midst of which it is fostered; that it should feed the trade of the country with a valuable export article is only an additional plea in its favor. There can be no difficulty in proving that our vine-growing industry is no worthless parasite. If we admit that a well-cultivated vineyard will yield an average of 2 tons of grapes per acre, or about 250galls. of wines, returning from 1s. 6d. to 2s. a gallon at the cellar door, we have a gross return of from £19 to £25 per acre; and if from these figures we deduct the comparatively large sum of £10 per acre for cultivation, manures, cost of manufacture, interest on land and buildings, &c., we are left with a net profit varying from £9 to £15 per acre. Can figures yielded by any other cultivated plant that is grown on a fairly large scale compare with these? Did our vineyard area extend over 100,000 acres instead of 18,000

the land under vines would yield annually from two to two and a half millions sterling, nearly one half of which would be distributed amongst the community, the rest representing the profits of the growers.

At this stage, in the absence of special knowledge of the matter, it might very relevantly be asked whether the arrest in the expansion of our vine area might not in some wise be connected with the law of supply and demand, whether the latter has not attained the extreme limits imposed upon it by the requirements of the market. To such a question I have no hesitation in answering in the negative, and our growing export trade would in a measure tend to uphold my views on the matter. On a rough estimate there are something over twelve million acres of vines in the world, and of these France alone probably possesses over five millions. What difference, it may be asked, would it make in the world's supply whether we possessed 18,000 or 100,000 acres? Then, again, so far as the market is concerned, we are in many respects in an exceptional position. The bulk of the wine made in the larger wine-making countries, such as France, Spain, Italy, etc., is of common, inferior type, nine-tenths of which is consumed locally. Few, if any, of the wine-importing countries discriminate between the value of wines by the adoption of *ad valorem* duties, and the freight remaining naturally the same in all cases, it is in general only the rarer and more valuable high-class wine that becomes an article of international exchange. And to this fact we can trace the origin of that time-honored prejudice of the British race that wine is the luxurious beverage of the rich, prejudice that pursues us even under our sunny clime, where wine is still retailed at 6d. a wineglass. Our wines as a class are undoubtedly superior to the bulk of the European wines, and are therefore well able to hold their own on the markets of the world. Wine, though in many countries a very common beverage, is on the whole so complicated in its composition and qualities that the just appreciation of its intrinsic value is, by common accord, left to the few whose special knowledge enables them to follow out its varying hues and shades. In consequence of this, more than any other article it has become subject to the tyranny of the known brand. The wines of a new country, however great their inherent qualities when first thrown on the market, have before them years of struggle ere they can obtain a fair hearing. To a very great extent, thanks to the efforts of the pioneers of the trade and the more recent work of the London Government Depot, our wines have overcome these initial difficulties: the world's markets will receive our wares, and we have but to keep pace with its ever-increasing demands. During the past year we are supposed to have exported some 500,000 galls.; more than 100,000 in excess of the previous year's efforts. Should the trade expand only in the present modest proportions, in ten years' time it will absorb the whole output of our present area. When we find ourselves face to face with this eventuality—and be it noted we are rapidly drifting towards it—we shall witness the dawn of a new crisis in our vine-growing industry; a strong demand for South Australian wines will have been gradually called into existence, and suddenly they will not be obtainable in sufficient quantities; customers will grumble at first, and then gradually succumb to the fascinations of the wines of other countries. Meanwhile the knowledge that our wines are temporarily at a premium will give birth to a new boom, and the whole community will rush feverishly into vine-growing, only to find when their vines come into bearing that their place has been occupied by others who were selling wines whilst they were growing vines; and the whole work of finding a new market will have to be recapitulated under far more trying circumstances. I take it, therefore, that, not only in the interests of benefits to be reaped in the future should our vine area steadily increase, but also in order to enable us to maintain unimpaired those it has cost us so much time and trouble to realise in the present.

A glut in the market not being within the realm of probabilities, what is it that is dwarfing the healthy growth of the industry? The simple fact that, under present conditions, combined vine-growing and wine-making absorb far more capital than the average agriculturist can ever hope to command. Vines he can grow, even though he may have to wait five or six years before he can reap any substantial benefit as the fruit of his labors. At a modest estimate, by that time each acre of vineyard will have cost from £20 to £30, or from £2,000 to £3,000 for 100 acres, which may be looked upon as a good average holding. But when to this sum must be added the cost of a fully equipped cellar corresponding to the acreage under vines and, roughly speaking, representing £3,000 to £4,000, when it is remembered that the wine must stand two or three years in the cellar before it can be marketed, and that finally, in addition to this, all the risks and initial costs in outlay of the bulk and retail trade are by conditions prevailing here to a very large extent thrown upon the winemaker himself, then it will become evident that the business is of such magnitude as to place it, notwithstanding the temptations of large profits, beyond the reach of the ordinary landowner.

Again, it may be objected that winemakers in other parts of the world are subject to similar disabilities. Without wishing to deny the fact that in every country of the world vine-growing absorbs more capital to the acre than most other agricultural pursuits, I am still able to refute this objection effectively. Our local conditions are incomparably more severe than those that prevail in most other foreign vine-growing countries. In the first place, the older vineyards and cellars have been slowly and gradually built up, and the present owners have no more to meet the initial outlay of a new creation—exception must of course be made for those whose vineyards have been destroyed by the phylloxera, but even here the cellars remained intact—they are in closer propinquity of the market, and are therefore saved much expense and some anxiety arising from the small grower's inability of supervising trade transactions thousands of miles away; and, further, an intelligent division of labor takes off the shoulders of our foreign rivals the important work of the wine merchant—in most cases all wines are cleared from the winemaker's cellar before the ensuing vintage—they are thus saved the expense of relatively large maturing cellars, and the anxiety of marketing small parcels of wine.

Thus far I have endeavored to show that under rational and gradually progressive development vine-growing would in the course of time prove a source of great wealth to the colony; that little fear need be entertained in regard to the difficulty of disposing of all sound wine of average quality that we are likely to produce; that in order to meet the increasing demands of the market, and even to avoid in a near future a check in present sales, it is necessary that our output should steadily increase; and, finally, that exceptional local conditions of an economic nature for the present effectively block all further progress. It remains for us to consider now the most rational method of placing the industry on a better footing. There is little doubt in my mind that it is the present unsatisfactory division of labor prevailing in the industry that is solely responsible for our present state of stagnation. Having in previous reports adduced strong arguments in support of this view of the matter, I deem it unnecessary to reproduce them here. The adoption of the more rational plan in vogue in other vine-growing countries, and referred to above, did not then appear to me feasible here, and, as tending to alleviate the evil, I could only suggest that, with the view of aiding the conversion of the vinegrower into winemaker, the State should offer to subsidise co-operative cellars. Such a scheme is evidently open to severe and, in a way, justifiable criticism on the part of those who have been able to work their way to the front on their own unaided resources. In my opinion, however, a more far-seeing policy would extend its approval to any scheme tending to increase

the volume of trade, and therefore in the long run to benefit all alike. Without endeavoring to discuss any further the justice of the suggestion, I am bound to confess that it appears to me that in spite of the apparent success of co-operative butter factories, in matters agricultural co-operation is doomed to failure. It is therefore with considerable pleasure that I am able to turn to a more recent proposal, inaugurated, I believe, in Victoria, and which offers a far more satisfactory solution of the difficulty. I refer to the alternative proposal of either offering State guarantee of interest to a large company formed exclusively with the object of buying up young wines and attending to their final disposal on the market, or else of the establishment of a State department undertaking similar work.

The great benefit that the adoption of either of the above schemes would confer upon the industry, and ultimately on the colony, cannot for a moment be put in doubt. Under provision, of course, of good management, so far as it is given to human foresight to predict, either proposal would from its initiation give an immense impulse to the trade; and as soon as it will have been enabled to definitely establish the soundness of its financial basis it will on all sides bring to life new vineyards and cellars. For, in the event of such a scheme being adopted, our growers would find themselves placed on the same footing as their foreign rivals; they would then be exclusively growers of grapes and makers of wine, but not wine merchants, to whom the more subtle and delicate manipulations of maturing and marketing should always be left. The present great cost of cellars—that would then no more have to house from three to four vintages simultaneously—would be considerably reduced; and what is still more important for the ordinary grower, who is never a large capitalist, he would be able to obtain immediate returns for the fruit of his labors. And thus the great source of uncertainty and anxiety that at present dominates the industry having been removed, we can confidently predict for it a period of healthy growth and development. From a totally different point of view some such scheme would prove a great boon to both the industry and its customers. So long as the number of our wine merchants remains equal to that of our cellars, customers both local and foreign will remain equally bewildered by the great variety and multiplicity of our wines, at times differing only in name, at others having only a name as a point of resemblance. To this fact the constant complaints received from our London *Dépôt* concerning the unevenness and lack of uniformity of our different brands of wines bear ample testimony. As a matter of fact, however great his skill, no winemaker can from year to year guarantee the absolute identity of his wines; and this is more particularly true under our somewhat trying and variable climate. Unfortunately the relatively small bulks that come within the manipulations of the ordinary maker are usually insufficient to enable him to adequately neutralise by means of blends the differences in type arising between his different vintages. How different the position in a central cellar, to which would flow from all parts of the colony wines all differing materially one from the other, but yielding by skilfully harmonious blends definite types that can be perpetuated from year to year. I trust, therefore, that this scheme, the formulation of which we owe to Victoria, will meet here with the same favor with which it has been met in the neighboring colony.

BUYING FRUIT TREES.—Men will sometimes incur a deal of expense and labor in preparing land for fruit trees, and then buy them at an auction from travelling tree peddlers. Such trees are almost invariably rubbish which the growers dare not offer except in this way. The trees are planted, cultivated, and cared for during four to seven years, and then are found to be worthless. If trees had been purchased directly from the nursery, the nurseryman would be liable to an action for damages if a guarantee had been given that they are true to name.

POULTRY NOTES.

Written for the "Journal of Agriculture and Industry."

By D. F. LAURIE.

NOTES.—Poultry will bring good prices for some time to come, and those who were successful in rearing a good number should find remunerative business. The secret of success is to keep the young stock growing, and then lose no time in fattening and disposing of them. One breeder has over 1,000 ducklings of various ages, and as many or more chickens. If a dozen other breeders would do the same the export trade would begin to go ahead. Ducklings at nine weeks should weigh 4lbs., and at three months 6lbs.; these are the weights for export. The following wholesale prices are quoted by Messrs. Brooke Bros., Leadenhall Market, London:—For prime ducklings of the Aylesbury breed—January, 3s. to 5s. each; February, 3s. 6d. to 6s. each; March, 4s. 6d. to 8s. each; April, 6s. 6d. to 10s. each; May, 6s. to 8s. each; June, 5s. to 7s. each. For prime chickens—January, 3s. to 4s. each; February, 3s. to 4s. each; March, 3s. 3d. to 4s. 6d. each; April, 4s. 3d. to 5s. 6d. each; May, 4s. to 5s. each; June, 3s. 6d. to 4s. 3d. each; July, 3s. to 3s. 6d. each. Such birds would be Dorkings, old English Game—Dorkings, and Indian Game—Dorkings. We can easily breed, ship, and land chickens and ducklings in England during these months of high prices. The above prices are for the most approved breeds and crosses; less favored breeds and crosses would bring lower prices, according to quality and appearance.

Eggs can be profitably sent to England, and it behoves some enterprising person to take up the trade. It is of course essential that the eggs are perfectly fresh, and sterile—that, is laid by hens running without male birds; they are much the better, as there is no risk of germination. Eggs have been shipped to England packed in pea husks in boxes with cardboard divisions; they were of good quality and attractive appearance. The consignment was carried at a temperature of about 33° F., cost about 3d. per dozen for freight and charges, and netted 9d. per dozen; the local price was 5d. to 5½d. In another shipment the eggs cost 5d. per dozen landed in London; they were sold at 1s. 4d. per dozen. Eggs are dearest in England in November, December, and January, so it is readily seen that eggs, when at their cheapest, could be purchased and shipped at a good profit. Producers by combination could, as soon as local prices fell, say, below 8d. per dozen, ship a succession of consignments, and divide the benefit. If hens are carefully selected for laying from the best specimens of the noted laying breeds, and if a succession of similar pullets is hatched, there should be no difficulty in reaching an average of about 220 eggs per hen per annum. The local price would average then somewhere about 8d. per dozen in Adelaide, but by means of exporting the average would be more like 1s. A good hen laying not less than 18 doz. eggs per year costs no more than the average "scrubber," which seldom lays half that number. Where hens have a fair range the outside cost per annum is 5s., so that even a poor layer makes a profit, while a mob of good layers brings in an income.

Many people who ought to know better are in the habit of looking at poultry-keeping as a hobby not worthy of consideration. How many industries are there that have reached the sum of fifty thousand pounds (£50,000), as was the case with eggs exported last year? This is only a fraction of what might easily be reached in three or four years if people generally were a little more energetic. So much practical matter is now part of the routine of State schools that it certainly would be a good plan to teach each child the rudiments of feeding, hatching, and rearing poultry. The parents would find it a profitable hobby

for the youngsters, and the rising generation would be accustomed to deal with a subject that will one day be one of our principal industries. France owes much of her prosperity to the enormous sales of poultry and eggs to England. There large establishments are few, cottagers and small farmers supply the bulk of the poultry exported; it is curious, too, that most of these people are well off. Over five millions sterling is the sum paid by England for her yearly supply of eggs, poultry, and game. It nearly all goes to the foreigner, and yet we are part of the British nation and lose this splendid market. Things are vastly different now to the days when so many lost money over poultry. We have now at our disposal the result of careful experiments conducted by well-known breeders on large and small scales, we know the most suitable breeds, and as long as we breed what the English consumer has a preference for we can never cause a glut, for we can export all surplus through the depôt for shipping produce.

A number of readers have asked me to deal with the Langshan fowl. I have had a great deal to do with the breed, and have seen a great many of the best in Australia of late years. It may simply be asserted that more has been written about the Langshan than about any other breed. The best known and most consistent champion of the Langshan is Miss Croad, an English lady, whose brother, Major Croad, introduced the breed to England in 1872. The Langshan comes from Langshan in China. Lang Shan means "two hills." Unlike any other Asiatics (such as Cochins, Malays, Brahmas, &c.), it has white skin and flesh. The Langshan is hardy, and stamps its character on its progeny, no matter what the cross may be. We have some excellent specimens in the colony at present; Messrs. G. Dean, Molloy & Phillips, Blee, Kneebone, and others usually exhibit some high-class specimens at our shows. In Victoria and N.S.W. the breed is still very popular, and strong teams are in the hands of numerous breeders. A lot of rubbish was imported in the early days, and not a few were unmitigated mongrels; unfortunately many of these lumpy, coarse, unprofitable birds are still to be found. As layers Langshans are excellent, especially during the winter months; as table birds they are also very good: crossed with the Indian Game or the Dorking, a very large quick-growing bird results, and carries a large amount of well-placed white meat with white skin. Crossed with the Minorca a grand all-round fowl results; a good layer and a quick-growing table fowl of very fair quality.

The following standard of perfection, issued by the "Langshan Fanciers' Association," should give a very full description as to what a good bird should be like.

"*Cock*.—Head: Small for the size of the bird, full over the eye, carried well back, free from coarseness; comb, single, upright, and perfectly straight, medium size, evenly serrated, and free from side sprigs, fine in texture, and brilliant red; wattles, of medium length, well rounded, fine in texture, and brilliant red; deaf ears, smooth, pendent, and rather long, brilliant red; beak, strong, well tapered, and slightly curved; eyes, large, bright, and intelligent, light brown to dark hazel (the latter preferred), with black pupils; face, fine in texture, and brilliant red; neck, of medium length, gracefully arched, broad at the base and tapering gradually to the head, covered with rich glossy hackle; back, of medium length, broad, the saddle abundantly furnished with rich, flowing hackles, and rising gently to the tail; breast, broad, deep, and prominent; a long breastbone, with abundance of white meat; body, large, deep, well rounded, wide at shoulders and full between the thigh joints, the fluff fairly developed, but not so abundant as to hide the profile of the back joints; wings, fairly large, neatly folded close to the body, but not clipped up, the coverts very brilliant; tail, large, full, flowing, well spread at base, and carried fairly high, but not squirrel-tailed, the coverts abundant and long,

plenty of glossy side hangers, two long sickles projecting beyond the tail proper several inches; thighs, of medium length, well developed, and wide apart, covered with close-fitting feathers, especially close round the hocks; shanks, of medium length, stout but not coarse, an even and distinct but not abundant fringe of feathers on the outer side; toes, long, straight, and slender, four in number, well spread out, the outer toe only slightly feathered; toenails, white; under foot, a pinkish white; skin, white and thin, on the legs and toes showing as a pink tinge between the scales, and between the toes as a vivid pink, which grows paler as the bird ages; plumage, close and smooth; size, large—an adult cock should weigh from 9lbs. to 10lbs., a cockerel from 8lbs. to 9lbs.; carriage, tall, graceful, upright, and alert, the bearing of an active, intelligent bird.

“NOTE.—A cockerel will appear taller than an adult bird, as depth and prominence of breast and fulness of body are not developed till maturity is reached.

“*Hen*.—With the following exceptions the hen is similar to the cock:—Comb, wattles, deaf ears, small, otherwise as cock; back, of medium length, broad, a moderate cushion rising gently on to the tail; body, large, deep, well rounded, wide at shoulders and full between the thigh joints, rather heavier at the stern, giving the appearance of more fluff than in the cock; tail, large, full, and well spread at base, carried gaily, but not quite so high as the cock's, the coverts, long, and standing well out from the cushion; size, large—an adult hen should weigh from 7lbs. to 8lbs., a pullet, from 6lbs. to 7lbs.; carriage, smart, graceful and alert, the bearing of an active, intelligent bird.

(NOTE.—As in the case with a cockerel, a pullet will appear taller than an adult hen.)

“*Color of Black Langshans*.—In both sexes: Beak, light to dark horn color (the latter preferred) shading to a pinkish white near the lower edges. Legs and feet: Dark grey or slate, verging on black, but turning a lighter shade after the first year; the scales rather loosely put on, thus showing the pink skin between. Plumage: Dense black throughout; the upper parts, wings, and tail glossed over with a brilliant metallic beetle-green sheen—the greener the better. Purple sheen is a great blemish.

“DISQUALIFICATIONS.—Yellow skin, yellow at base of beak or around the eye, under foot yellow, absence of pink between the toes, legs other color than standard, shanks not feathered, outer toe not feathered and showing no indication of having been feathered, five toes, permanent white in face or ear lobe, comb other than single, wry tails, squirrel tails, size not within 1lb. of standard weights, white or colored feathers except in foot feathering.

“SERIOUS DEFECTS.—Feathering on middle toes, too scantily or too heavily feathered shanks or outer toes, twisted toes, short shanks, crooked breast, comb not perfectly straight or with side sprigs, tail too whiplike or too scanty, general coarseness, blue or purple sheen.”

This standard is one of the best descriptions of the breed that has come under my notice; still there are two points on which I differ. The principal authorities I have read, and those in Australia whom I have consulted, fully bear out my contention. Centre toe feathering should certainly rank as a disqualification; it did not exist on the first specimens, and, while being a characteristic of the Cochin, is certainly not of the Langshan. Then comes the question of the crooked breast. It is again agreed that in a table fowl, or in a breed representing such, this should be a disqualification. Judges always “pass” birds with either of these blemishes. Knowing that the greater number of cases of crooked breasts are due to hereditary defects, as against deformity caused through roosting on too narrow a perch, I would throw out all crooked-breasted birds. It has been stated in one of the intercolonial

papers that South Australia is lacking in Langshans of first quality, but this is not correct. Messrs. Barnes & White, of Bute, on two occasions showed, first the Sydney winners, and next year the Melbourne winners purchased from Mr. G. E. Andrews, of Caulfield. Then Mr. G. H. Dean purchased from Mr. W. H. Webb, of Bathurst, a Langshan cock, sire of one of the winners at the Sydney Poultry Club show, and which was said by Messrs. J. C. Coupe, Alec. Anderson, W. Fry, Ramsay, Cadell, and Tyzack to be the best cock or cockerel at the show held in July last by the N. S. W. P. P. D. & C. Society. We have plenty of Langshans of excellent blood and quality in this colony.

Mr. J. McDonald, editor of "Stephen's Book of the Farm," writes:—"In farming, the day of small things has assuredly come. Poultry is a subject of the greatest national importance, and is one of the small things which might well contribute in a much greater extent than heretofore to the farmer. To small farmers and cottagers, poultry-keeping is indeed, or ought to be, much more than a small thing. When properly conducted it is a reliable and remunerative source of income, and its reliable character is a consideration of the greatest importance, especially to the poorer class of farmers, who require the entire produce of their holdings for the bare necessities of life." If this is true in England it applies equally here. Our blockers and settlers should take the hint before it is too late.

FARM NOTES.

BY W. LOWBIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,
ROSEWORTHY, SOUTH AUSTRALIA.

Written for the "Journal of Agriculture and Industry."

The end of this month (December) has been characterised by beautiful harvest weather, and wheats are yielding better than was anticipated. The heavy winds and boisterous changes predominating earlier in the month reduced the yields of many paddocks sown with varieties liable to shed out. Fields have come under my notice where from 4bush. to 5bush. was out on the floor, and it has been very pointedly brought to the attention of the farmers generally that the selection of seed wheat with a view to its ability to hold its grain in rough weather is an important matter. On the whole my experience with such wheats as we have been growing is that the bearded varieties hold their grain better than the beardless. They seem also to be hardier, and to return better under adverse conditions and in inferior soils. Of course in good soil and under favorable conditions the beardless wheats give ever the best returns.

We have not yet completed thrashing at the college, but will be through before the Christmas holidays. It may be worth while to give a statement of such yields as we have gathered up to date. I anticipate, however, that our average will be better than these yields represent, as we are now engaged in thrashing the crop from the field that was earliest sown, and from appearances it is bearing proof of the advantage, so often pointed out, of sowing early.

Tests of Manures.—In these tests a wide variety of manures was used to serve more as a demonstration to farmers than as work of much experimental value. The plots also offer useful lessons to the students, who can take notes of their progress from time to time during the season, and can satisfy themselves, sufficiently approximately, as to the manures likely to prove most remunerative under our conditions. Two hundredweight per acre of superphosphate was the basis around which these demonstration plots were laid out.

as it has been again and again urged that superphosphate is the first consideration. Most of the superphosphates on the market were tried side by side, and the results, as seen below, are fairly harmonious. In addition to various superphosphates, bonedust, Ohlendorff's guano, Bernard & Algers' manures, and Trotman's manures were used. Further, with a view to continuing experiments concerning the value of nitrogenous and potassic manures used with phosphatic manures, in one plot sulphate of ammonia and kainit and in another sulphate of ammonia was used in addition to the superphosphate. It will be understood that such manuring as this is not recommended for regular commercial work—it is too heavy for our climate, but it was necessary to keep the weight of superphosphate in this instance the same as in the plots without nitrogen.

Results of Tests.—King's Early wheat being used throughout:—

Manures used per Acre	Yield per Acre.	
	Bush.	lbs.
{ 2cwts Colonial Sugar Co.'s super	{ 24	25
{ ½cwt. sulphate of ammonia		
{ ½cwt. kainit		
{ 2cwts. Colonial Sugar Co.'s super.	{ 22	39
{ ½cwt. sulphate of ammonia		
2cwts. Ohlendorff's guano	22	36
2cwts. Ohlendorff's super.	22	16
2cwts. Barnard & Algers' dissolved bone compound	21	34
2cwts. English super.	21	2
2cwts. Barnard & Algers' concentrated manure	20	6
2cwts Adelaide Chemical Works super.	19	45
2cwts. Colonial Sugar Co.'s super.	19	42
2cwts. Barnard & Algers' super.	19	3
No manure	18	40
2cwts. bonedust	18	11

Trotman's leather manure applied with eighteen coulter of drill yielded at the rate of 20bush. 53lbs.

With one or two exceptions the plots were two and a half acres in area. I am inclined to think this too small, though to make them larger it would be necessary to curtail the number, and in future years I will work in this direction. As things are the margin of error on a two and a half acre plot is too large proportionately. It is impossible to get all the land absolutely even, and on a plot of that size a water-logged spot a few yards across may affect the yield, and if more than one in the same plot the results will of course be affected proportionately.

In the series of manured plots it will be noticed that the unmanured plot yields relatively high. This is the result of the residuum of the manures applied to the same field in 1895. If the land had been unmanured all through 8bush., or probably 10bush., would have fully measured the return. That the manuring of former years should not affect the relative tests for this year, the plots were laid out at right angles to the direction in 1895. It will be evident also, I think, from the results from these plots, that a condition of things is approaching when it will be unnecessary for me to use such heavy dressings as I have hitherto been in the habit of doing.

To obtain 18bush. per acre from land not directly manured affords reasons for the conclusion that the soil is gradually getting back to good heart, and to a state of fertility that will enable it to carry the maximum crop the rainfall admits of.

Broadcast v. Drilling Tests.—In these the plots were also two and a half acres in area, sown with Leak's Rustproof wheat on June 12, and manured with 2cwts. English superphosphate per acre. Owing to the wheat shaking out badly the yields were considerably affected.

Plot 1—Wheat, drilled; manure, broadcasted; yield, 15bush. 25lbs. Plot 2—Wheat and manured, broadcasted; yield, 13bush. 19lbs. Plot 3—Wheat, drilled, shallow; manure, drilled deeper; yield, 12bush. 13lbs. Plot 4—Wheat and manure drilled; yield, 13bush. 58lbs.

Tests of Varieties of Wheat.—All plots, two and a half acres in area, and manured with 2cwts. English superphosphate per acre: —King's Early, yielded 22bush. 57lbs. per acre; Baart, yielded 18bush. 12lbs. per acre; Early Para, yielded 15bush. 50lbs. per acre; Smart's, yielded 14bush. 12lbs. per acre; Leak's Rustproof, yielded 13bush. 58lbs. per acre; Purple Straw, yielded 12bush. 23lbs. per acre; Baroota Wonder, yielded 11bush. 43lbs. per acre. In these tests the late wheats all suffered severely. From end of August to October 28 the total rainfall registered was less than 1in., distributed in showers which the next few hours of rough winds licked up. All the varieties suffered somewhat, but the late ones especially. This partly accounts for the poor yield from Leak's Rustproof. In the case of Smart's and Early Para, early wheats, the grain was badly shaken out. When ripening they promised yields closely comparable with King's Early which hold the grain splendidly, but from 4bush. to 5bush. or even more per acre was laid on the floor. Smart's suffered worse than Early Para, some portions looking as if they had been stripped.

Thick v. Thin Sowing.—Thin sowing, about 45lbs. per acre, yield 21bush. 58lbs. Thick sowing, about 90lbs. per acre, yield 24bush. 31lbs.

It may be noted that the rainfall for the year totalled 17½in.

FARMYARD MANURE.

The Ontario Department of Agriculture has just issued an instructive bulletin on the making and application of farmyard manure, many points in which will be of interest to our farmers.

It is claimed by many that special manures are more economical to use than farmyard manure, which, being in a sense a complete fertiliser—that is, containing all the elements necessary to plant growth—may supply more of one particular constituent than the soil requires, sometimes to the injury of the crop, besides being slow-acting, bulky, and expensive to handle. Against this, however, is the fact that farmyard manure is a by-product of the farmyard, consequently the farmer can afford to pay the extra labor required to make use of it; that being slow in action the plant food contained in it is gradually made available for plants, so that with judicious management putting in an excess of any constituent with the dressing of farmyard manure should have no injurious effect; that it supplies humus, or vegetable matter, so necessary not only for the plant food, but also because it improves the water-holding power of soils and renders clay soils more open in texture, more easily worked, and altogether more favorable to the development of plant roots; it is more lasting in its effect; and is believed by some authorities to add to the soil certain bacteria which exert a very beneficial influence in making plant food in the soil available.

In regard to the lasting effect of farmyard manure, experiments were commenced at Rothamsted, England, in 1852. Plot 1 has been cropped with barley every year since, without adding any manure. Plot 2 received a dressing at the rate of 14 tons of farmyard manure per acre each year for twenty years, barley being grown without intermission, and then it was divided into two parts,

one being cropped each year without manuring, the other receiving the same dressing each year. For the first twenty years plot 1 averaged 20bush. per acre, plot 2, 48½bush. During the next twenty years plot 1 averaged 13½bush., the unmanured part of plot 2, 30½bush., and the manured part, 49bush. For five years ending 1896 the unmanured part of plot 2 averaged 24½bush. against 11½bush. from plot 1. This shows that although twenty-five years since the portion of plot 2 received any manure it continues to show a marked advantage over plot 1, which received no manure during the whole experiment.

The liquid excrement of animals is very much richer, weight for weight, in nitrogen and potash than the solid excrement, but contains practically no phosphoric acid. The following figures represent the average of American analyses:—

PERCENTAGE COMPOSITION OF SOLID AND LIQUID EXCREMENTS.

Name.	Nitrogen.	Potash.	Phosphoric Acid.
	per cent.	per cent.	per cent.
Cattle excrement, solid	·29	·10	·17
“ liquid	·58	·49	—
Horse excrement, solid	·44	·35	·17
“ liquid	1·55	1·50	—
Sheep excrement, solid	·55	·15	·31
“ liquid	1·95	2·26	·01

At Rothamsted, after many years of careful experiment, it was found that the liquid excrement from fattening oxen contained on an average 73 per cent. of the nitrogen in the food consumed by the animals. This forcibly illustrates the necessity for making use of the liquid excrement.

The writer of the bulletin under review, after considering the advantages and disadvantages of tanks for liquid manure, came to the conclusion that they are unnecessary, and that the best means of saving the liquid is to have watertight floors to stables with wide shallow gutters in which cut straw, or sawdust, or a mixture of both should be placed to absorb the liquid. With open yards, care should be taken to prevent drainage of water into the yard, or of drainage of liquid from the heap. Manure that contains a considerable amount of straw will, if kept in a compact heap, exposing as little surface as possible, absorb nearly all the rain that falls upon it. The more ground the heap is spread over, the more fertilising constituents are washed out by rain. Where practicable it is of course better to keep the heap roofed over.

Before the nitrogen in farmyard manure becomes available for plants, it must go through certain changes brought about by the processes known as fermentation and nitrification. The question as to whether these changes should take place in the heap or in the soil—applying the manure to the soil in a rotted or fresh state—is still a matter of doubt. To ferment manure in the heap without losing a great proportion of the nitrogen requires great care. Fermentation must be slow, and this can be regulated by checking the supply of air which is necessary to the existence of the bacteria causing fermentation. On the other hand, if air is excluded from the heap by too close packing, another form of bacteria causing injurious changes in the composition of the manure take possession. A careful study of the question of fermentation in the heap leads to the conclusion that conditions are more favorable to a great deal of the nitrogen being lost. When, however, fresh manure is mixed with the soil, fermentation is gradual, the air is freely admitted, and the mineral matter in the soil combines with the nitric acid as it is formed.

Professor Warington says—“The original voidings of the animal have a far greater manurial value than the final product of the manure heap which the

farmer carries to his fields. In the whole process from the stable to the field the loss of nitrogen is going on, this loss falling on the most valuable constituent of the manure, and resulting finally in a residue of comparatively inert matter." On the whole the bulk of the evidence is in favor of applying the manure in its fresh state. In regard to the use of substances to prevent the loss of nitrogen from manure heaps, it has been found that the influence of gypsum is comparatively slight, lime and Thomas phosphate are injurious, kainit is of doubtful value, superphosphate and sulphate of iron prevent the escape of ammonia, but their use is not practicable, while dry earth containing a considerable amount of humus is one of the best and safest preservatives to use.

The time of application of farmyard manure will largely depend upon circumstances. In this colony it must have time to become thoroughly incorporated with the soil before any grain crops can safely be sown. It should be kept as near the surface as possible, consequently it should be ploughed shallow. Moderate applications of manure thoroughly incorporated with the surface soil are better than heavy dressings ploughed in deeply. Practical results seem to indicate that 15 tons per acre of fair quality manure should be regarded as the maximum quantity for the heaviest feeding crops, such as roots and maize, on average soils, while for wheat 10 tons or even less will make a heavy application. Moderate applications over a large area will give better ultimate returns than heavy applications to a small area. Experiments at the various American experiment stations show that unless the manure is very firmly packed very serious losses occur in the heap during the summer months, hence the conclusion that the manure should be carted on to the land in spring, or spread on the land during the autumn and incorporated with the soil at once. In the latter case the land should be in good condition for spring crops. With land intended for fallowing in this colony it would give the seeds contained in the manure every chance to germinate and be destroyed by means of the cultivator, the cereal crop reaping the benefit the following season.

SALE OF COMMERCIAL OR ARTIFICIAL FERTILISERS.

BY W. L. SUMMERS, INSPECTOR OF FERTILISERS.

The Fertilisers Act Amendment Act of 1898 and the Fertilisers Act of 1894, with which it is incorporated, provide--

That all articles for use as fertilisers of the soil, other than farmyard or stable manure, crude nightsoil, offal, or other refuse, but including guano, must be sold with a guaranteed analysis of constituents.

Every person carrying on business as a manufacturer or seller of a fertiliser must, within thirty-one days of January 1, 1899, give notice in writing to the Inspector of Fertilisers, at the office of the Minister of Agriculture, of his place or places of business, and of the names of the fertilisers sold by him. Any person failing to give such notice is liable to a penalty of £2 per day.

The Minister of Agriculture is required to appoint one or more inspectors of fertilisers, who are empowered to enter any place where fertilisers are sold, and take samples of same for analysis. The results of such analysis, together with the seller's analysis and the price charged for fertiliser, may be published in the *Journal of Agriculture and Industry* and other newspapers.

Every person who sells more than 1 cwt. of any fertiliser must deliver to the purchaser an invoice stating name and place of business of the vendor or manufacturer, the figure or trade mark on the packages, the fertilising constituent

contained in such fertiliser, and the unit value per ton the vendor attaches to each constituent. Such invoice shall have the effect of a warranty by the seller of the statements contained therein

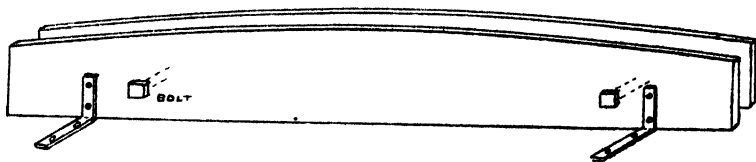
Any person selling a fertiliser, and failing to give such invoice to the purchaser, or permitting any invoice or description of the article sold by him to be false in any material particular, is liable to a penalty of £20 for the first offence and £50 for each subsequent offence.

All sacks or packages containing fertilisers must have branded upon them, or durably affixed thereto, the name of the manufacturer or vendor, and a figure, word, or trade mark which shall correspond to such figure, word, or trade mark stated in the invoice. Any failure to do this renders the seller liable to a penalty of £10 for first offence and £25 for each subsequent offence.

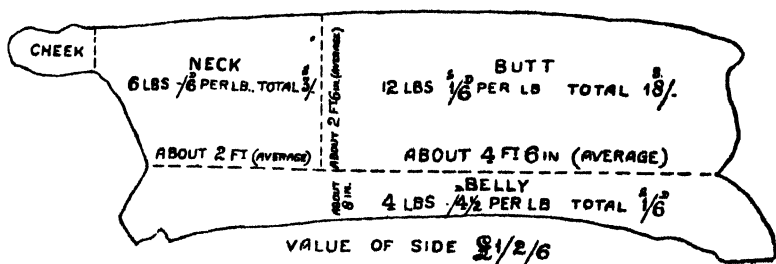
The fees chargeable for analysis by the Government Analyst are—For seller or vendor, 10s. 6d. for each determination, or £3 3s. for complete analysis. For purchaser, provided sample is accompanied by the vendor's invoice, 3s. for each determination.

SOME HELPS FOR THE FARMER.

When the crosscut saw has to be sharpened (which should be often, in order to save labor and ensure quick and easy work) it is often found to be an awkward job. What is wanted is a clamp, and this can be very easily made from two pieces of 1½ in. board, with two bolts each having a screw and nut with fixed handle. In the illustration the back of the clamp is most prominent. It is fixed to a log, or rail, or other convenient object by cleats. The back of the crosscut saw rests upon the bolts, the heads of which are shown. When thus placed, the nuts on the other side are wound in by the handles, bringing the other cheek of the clamp tightly against the crosscut, and all is then ready for the man with the file.



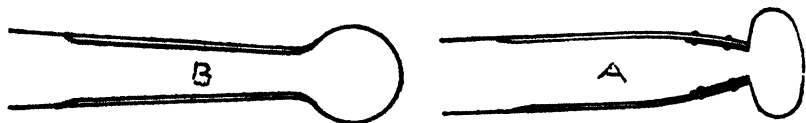
Where to place the brand on a beast is of greater importance to the farmer than at first appears. It has been argued that the brand *must* be in a prominent position, and that it is better to lose the value of the hide than to lose the beast with its hide. That is very specious; but there is no need to lose either. At present it is usual to brand upon the most valuable portion of the hide, with the result that its value is lessened to about half. The *Australasian* recently published a diagram like this—



showing the relative value of the different parts of a bullock hide. "Taking a tanned hide, one side of which weighs 22lbs., and, assuming the present value of the side to be £1 2s. 6d., the value of the 'butt' or middle portion, including the rump, hip, loin, back, and ribs, would be 1s. 6d. per pound; the neck, which includes the front portion of the shoulder and brisket, 6d.; and the belly portion, which comprises the thigh, with lower portion of the shoulder and forearm, 4½d. per pound." The cheek is scarcely worth anything, and the neck, thigh, and lower portion of the shoulder are from 65 per cent. to 75 per cent. less value than the other parts of the hide. It stands to reason that it will be very greatly to the advantage of the farmer if he puts the necessary brands upon those parts which are of the least value.

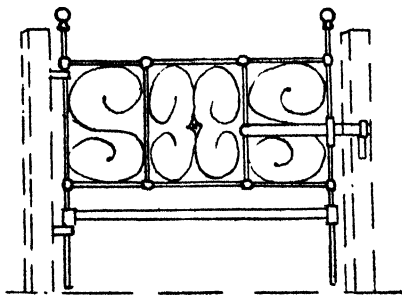
HOUSEHOLD CONVENIENCES.

Mr. T. Casley, Hon. Secretary of Mount Remarkable Branch, shows another use for worn-out sheepshears, by converting them into kitchen fire tongs. The blades can be cut away and converted into knives, as shown in previous numbers of this *Journal*, and the bows pierced in two places on each limb, as shown in illustration A, to allow of the legs of the tongs being riveted on. The legs can be made with pieces of hoop iron taken from bales of woolpacks, rounded up after being heated.



At Port Broughton, Pine Forest, &c., combined Branches shows held during last two years, amongst a hundred articles made from waste substances, were excellent tongs made from iron hoop taken from bales of woolpacks. The legs were rounded up by bending the edges together, the clamps at the end and the bow being left flat. The rough surface was dressed off with a rasp, and then sandpapered, and the work was very creditable. Illustration B above will give a rough idea of how the tongs were made.

A neat gate for the flower garden, which will not exclude fowls, however, can be made from portion of an old bedstead, as here shown.



By utilising other portions of the same piece of old furniture a double gate or gate and gatepost can be manufactured; in fact, every part of the bedstead can be used up to advantage in the construction of a really handsome entrance to the garden, and a little extra ingenuity will devise means to keep the poultry in their proper place.

HOW TO TAN AND DYE SHEEPSKIN MATS.

"A Tanner" in the Melbourne *Weekly Times* tells how to tan and dye sheepskins for mats. He says the skins of Merinoes and comebacks are not suitable, and prefers a skin from a Lincoln or a cross between a Lincoln and a Leicester. The wool should be at least 5in. long, having a silky fibre and curly tips.

Tanning.—If the skin is perfectly fresh soak it in clean water for two hours. Make a "tanner's beam" from a log 18in. diameter, 6ft. long, split in two. Smooth off the round side of one piece and place it on a trestle, one end on the ground, the other elevated to the height of the waist. Lay the skin on this, flesh side uppermost, and with a blunt knife remove all pieces of fat or flesh. A good substitute for a tanner's knife can be made with a piece of scythe blade 15in. long, having the rough edge smoothed off so that it will not cut or tear the skin. After cleaning off all fat and flesh leave the skin on the "beam," and rub in a good handful of fine salt thoroughly; then rub in a similar quantity of finely-pulverised or burnt alum. Next fold the skin, flesh side in, and lay in a cool place for twenty-four hours; then open it out. Dissolve a handful of alum in a quart of water, rub the liquid well into the flesh side of the skin, fold as before, and place in a cool spot for twenty-four hours again. Once more open out, rub again with the alum water, fold, put away in a cool place for a third twenty-four hours, by which time the skin will be thoroughly tanned.

Scouring.—Dissolve 4ozs. washing soda in 3galls. of boiling water; place the skin on the beam with the wool side up, give it a good washing with the water as hot—and no hotter—than the hand can bear. Then take a bar of common soap and rub well into the wool until a good lather is made. Then apply more warm water, and alternate the process until all grease and dirt is washed out. Then to 2galls. of warm water add a tablespoonful of carbonate of ammonia and the same quantity of alum, and repeat the scouring process until the wool is perfectly white; rinse in clean cold water, take the skin by both hind shanks, give it a good shaking; then by the front shanks, and shake till all drops of water are shaken out. Place two pieces of stout quartering against a wall, tack the skin lengthwise to them with the flesh side out. Draw the quartering apart till the skin is tight. Dissolve a handful of alum in a quart of warm water; apply it on the flesh side with a rag or sponge every day until the skin is dry.

Dyeing.—If white is required leave the skin stretched on the frame, and with a clean brush take off all drops of water from the tips of the wool. Then cover the frame with a large sheet; place some live coals on an old shovel or other suitable vessel, sprinkle some sulphur on and place beneath the sheet, and confine the sulphur fumes as closely as possible. At intervals of an hour repeat the process until the mat is as white as required; then remove it from the frame, hang it up, wool side to the light, in a shady place where there is a draught. As it dries, pull into shape with the hands frequently. For an orange color, provide a packet of scarlet diamond dye and threepence worth of picric acid. Mix the dye in a galvanized-iron washing-tub in 2galls. boiling water, as directed on packet, add clean cold water until the heat can be borne by the hand. Fold the mat once, flesh side in, and dip into the dye, lifting and dipping it for about fifteen minutes. Then hang up to drain. Next dissolve half a teaspoonful of picric acid in 2galls. of boiling water; add clean cold water until cool enough for the hands, plunge the mat in, and continue working it until the mat has assumed the color of a lemon; then hang it in a shady place to dry, pulling and stretching it as before directed. When dry place the

mat in the sun, wool side up, so that the sun shines upon the whole at once—this deepens the color. When the desired color has been developed shake the mat well, and take indoors and trim it to the desired shape. This color is fast, brilliant, and deepens on exposure to sun. Various shades of red are obtained by the use of rosine in greater or lesser quantity or strength. Make a mordant by dissolving 2ozs. of alum in 2galls. of boiling water, add rosine in small quantity until the desired shade is obtained; cool down as before directed and plunge the mat in and work it about until the whole of the wool has turned red, rinse through clean cold water, and hang up to drain. If the color is not deep enough repeat the process with stronger dye. Various other colors can be produced by a similar treatment with the aniline dyes.

MILK FEVER.

By ALICK J. MURRAY, MOUNT CRAWFORD.

I have used the following remedy for milk fever with many cows and have never known it to fail. It is simplicity itself, and only requires ordinary intelligence to treat the animals satisfactorily. The cow will generally show symptoms of fever during the first four days after calving, or be fairly safe to escape it. The attack increases in violence as a rule after each calf. The novice will best detect it by noticing a restlessness in the hind legs and a tendency to keep lifting one foot from the ground, probably hardly removing the foot but shifting the weight from one foot to the other, besides dryness and heat on the nose. I believe milk fever is always, or nearly so, accompanied by costiveness. The treatment is as follows:—As soon as any symptoms of fever are noticed tie the head of the cow to a beam of the stable and give her half a bottle of brandy with about the same quantity of water; repeat in about three hours, two drenches being sufficient. A lemonade bottle makes a cheap and easy means of administering the drench. It is absolutely necessary to keep the bowels open; if this is not effected a cure is impossible. I use 6oz. to 8oz. Epsom salts in water, administered with the first dose of brandy. Watch the cow carefully, and see that the bowels are kept open. Some people object to give green feed to a cow suffering from milk fever, but I find the brandy so checks the flow of milk that it is quite safe to give green feed, and much prefer it to any other feed. The cow should have as much freedom as the weather will permit, and be allowed exercise.

THE BEEHIVE.

NOTES AND HINTS FOR JANUARY.

By APIS LIGUSTICUS.

In the neighborhood of Adelaide this is the beekeeper's harvest time, when he expects to recoup himself by a good return in honey for all the labor and attention that has been given to the bees during the last two or three months. The gum trees are just coming into bloom, and there is every promise of an abundant flow of honey from this source. If the hives have been cared for in the manner described in previous numbers of this *Journal* they should all be crowded with bees and in a proper condition to take immediate advantage of the yield of honey offered by the eucalypts. It should be remembered that the larger the force of workers in each hive ready to take the field in search of stores the larger will be the amount of honey gathered, and that one good

colony will store more surplus honey than several less populous colonies. The *sine qua non* for a good hive is a prolific queen; and, if the surplus is required in section boxes, the queen should be a young one. The beekeeper should decide at once as to whether he wishes to secure his crop of honey in section boxes or to take it with the extractor. Section boxes are more trouble, and less honey is secured than by the use of the extractor; but, on the other hand, the boxes find a readier market and sell for a better price.

Section Boxes.—There is no operation connected with the care of bees that requires more experience and judgment than that of putting on and taking off boxes. If the boxes are put on and the bees do not at once enter them they will soon become soiled and lose that clean appearance that is so essential in packages of comb honey. It is a good plan to remove some of the combs from the hive, so as to crowd the bees into the section boxes. Six frames are all that are required in a hive when worked for comb honey; therefore all the other frames should be removed and placed in some other hive that is being worked for extracted honey. In selecting the six frames to remain in the hive see that they are well filled with brood, and have nice straight combs that can be arranged with spaces of not more than half an inch between each comb. The number of boxes required for each hive will depend upon the strength of the colony and the amount of forage available. About twenty-four boxes is enough to put on a hive at first, and when these are partly filled another set may be added. The first set, containing the partly-filled boxes, should be raised and placed on top of the second set. All boxes should be promptly removed as soon as full, so that the whiteness of the comb may not be soiled by the bees passing over them. As the filled boxes are removed they should be cleared of bees by giving each box a quick jerk in front of the hive. With Italian bees it may be necessary to brush them off the boxes with a feather. In all operations connected with putting on or taking off section boxes the free use of a smoker will save much time and trouble, and such work should only be done on a fine day when most of the bees are away in the fields. As each box is removed from the hive it should be examined to ascertain if any cells contain pollen. Such boxes should be kept by themselves where they can be looked at frequently, as moth-worms are much more liable to be found in them.

THE VINEYARD.

NOTES AND HINTS FOR JANUARY.

By ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

Written for the "Journal of Agriculture and Industry."

With the dawn of the new year we come within view of the goal of our yearly labors—the vintage. Like Easter, this festival is a movable one, fitting capriciously from year to year betwixt extreme limits, frequently separated by more than five or six weeks. The season as a whole of course practically determines the date of the fruit harvest, but undoubtedly the midsummer months exercise a predominating influence in the matter. Before it can attain to perfect maturity each special variety of fruit must come under the influence of a definite quantity of heat, and according as this heat is accumulated in a relatively small number of days, or spread over a comparatively larger space of time, or, in other words, according as the summer is unusually hot or unusually cold, the vintage is correspondingly advanced or postponed. Gasparin, a French agricultural writer of no mean standing, after a long series of experiments, was able to classify the different known varieties of vines according to

the amount of heat required by each special variety for the maturing of its fruit. I append an abstract of his table that may prove of interest:—

Classes.	Examples.	Amount of heat expressed in degrees Centigrade required from bursting of buds to ripening of fruit.
I.	Early table grapes	2264° C.
II.	Pinot, White Sauvignon	3400
III.	Shiraz, Gamay, Semillion	3564
IV.	Malbeck, Carbernet-Sauvignon	4133
V.	Aramon, Carignan, Grenache, Mataro, Verdal, Muscatel	4238

These figures, which are after all only approximative, are gathered from a thermometer with blackened bulb and partially under the influence of direct solar radiation; in this manner the conditions affecting the average bunch of grapes are as nearly as possible simulated. The daily mean obtained in this manner naturally exceeds that yielded by thermometrical readings taken in the shade. In this connection, however, should not be forgotten the potent action exercised by light on the development and ripening of the fruit; bright, sunny days, independently of the heat that usually comes in their wake, stimulate plant life to rapid and vigorous growth, whilst dull cloudy days invariably checks it.

Any attempt at the present stage to forecast the probable date of the approaching vintage would be rather premature; very much depends on the mean January temperature. Thus far it may be stated that the abnormally cool weather that obtained in November and December has to a great extent checked the development of the fruit, and that in consequence, all things considered, a later vintage than the last one may with confidence be anticipated, though not necessarily a very late one.

Whatever weather January may have in store for us, it is during the course of this month that in most districts the fruit will begin to turn. The vines are therefore about to enter upon a stage most important in both its physiological and practical aspects. All growth of the fruit-bearing plants will be temporarily checked, whilst all their vital energies will be devoted to accumulating in the fruit and seed large quantities of nutritive substances. Up to this stage, and so long as it retains its green color, though partially fed by the leaves, the young berry, like a leaf, practically leads an independent life, elaborating sap and building up its own tissues. As soon, however, as it begins to deposit its coloring matter beneath its rind it becomes a parasite on the whole plant, its chlorophyll is destroyed, and the leaves flood it with sugar and alkaline sap. The whole plant suffers from this operation; that continues until the seeds are completely ripe, the shoots droop, the leaves become more or less flaccid, and the most healthy of vineyards present a languishing and weak aspect. In the following lines the poetic sons of the South of France have not unjustly likened these periodical troubles of the vine to the pangs of childbirth—

*Qu'aou vei lu bigno aou mes d'aou
Vei sas doulous,*

which, being interpreted, "He who sees the vine in the month of August (our January of course) is witness of its pangs (of childbirth)."

When this critical stage is reached in well-regulated vineyards matters should have been so arranged that the plants are surrounded by conditions most favorable to their development; the scil should present a clean well-cultivated surface that it will generally be unnecessary to stir up any further during the course of the month.

In fact, beyond odd jobs and preparatory work in anticipation of the ~~fast~~ approaching vintage, in January there is little to be done in the average vineyard. Should we be favored with rather heavy showers it would be advisable to scarify again the soil of newly-planted and young vineyards not in bearing. Old vineyards had generally better be left alone, both in consideration of the turning of the fruit and of the fact that scarifiers always tend to disturb bunches that had hitherto lain secluded beneath the protecting shade of the leaves, and thus rendering them liable to sun-scald. Grafts should be visited where necessary.

I had originally intended making some remarks on the prospects of the approaching vintage; in consideration, however, of the numerous disastrous hailstorms that have recently visited us, and the difficulty of always ascertaining the amount of damage done to the fruit, I have thought it preferable to postpone them to the following month.

DISTRIBUTION OF WATER.

For irrigation purposes water is distributed over the land, either by flooding or by means of sprinklers. The question as to which is the better method will depend upon individual circumstances. Where the water supply is good and continuous, and the land of a suitable nature and level, flooding will undoubtedly be the best for most crops; while in sandy and uneven ground, and where the water has to be raised by mechanical action, distribution by means of sprinklers will probably be best. In small orchards and gardens this is indeed the only way the water can be satisfactorily applied. One of the drawbacks to the use of sprinklers is the constant attention they require, besides their liability to get out of order and the force necessary to spread the water. By an ingenious adaption of the cyclone principle, Mr. E. R. Wilhelm, of Clarence Park, has overcome these three difficulties by means of a sprayer which he appropriately names "The Rainmaker." The water enters a small chamber at the bottom, but on the side acquires a circular motion, and, leaving the chamber through an aperture varying in shape according to nature of the spray required, is distributed over a wide area in the form of a fine spray. According to the size of the sprinklers and the quantity and force of the water the area covered ranges from 20ft. up to 60ft. in diameter. As there are no movable parts, there is nothing to get out of order. For lucern, potato crops, vegetables generally, lawns, and flower gardens, these sprinklers will be of considerable value. In the illustration is shown how they can be utilised for watering fruit trees, &c. The tripod can be lowered if desired, and the arms contracted to half the size shown. This will cover an area 80ft. in diameter; the spray on the left is circular in form, that on the right, fan-shaped, and throws the water beyond the ground covered by the other. The pressure of water when the sprinklers are fixed in a certain position causes the arms to revolve slowly, thus ensuring an even distribution of the water. Such an apparatus can only be worked from the mains or where the supply tank or reservoir is about 20ft. above the top of the distributor; with 10lbs. of pressure sufficient force is obtained to cover a diameter of 80ft. Owing to the fineness of the spray and the area covered, the water can be allowed to run for ten or twelve hours without any fear of waste, no attention being required during that time. There can be no doubt that fruit trees would be greatly invigorated by a thorough cleansing of the foliage occasionally, and the fruit also improved, and as most of the water used would reach the roots, two ends would be gained at one operation. The small stand on the left of the illustration distributes water over an area of 60ft. with less pressure of water. Practical gardeners who have seen the apparatus at work are well satisfied with it.



THE RAINMAKER.

A MODEL EXPERIMENTAL FRUIT FARM.

BY THOS. HARDY, BANKSIDE.

During the month of August I visited the experimental fruit farm at Woburn, near Bedford. This farm was started in 1894 by the Duke of Bedford, as a model and experimental garden and orchard for the benefit of his tenantry and all who are interested in fruit-growing, both in the United Kingdom and abroad. Mr. Lewis Castle, who is an enthusiastic botanist and practical fruit-grower, and has the management of the farm and has everything connected with it and its objects at his fingers' ends, explained everything of interest to us.

The farm consists of twenty acres of the average arable land of the neighborhood. The soil seemed rather heavy and sticky and pretty full of small stones, and I should think bad to work in wet weather. It slopes slightly towards a brook on one side, and that side appears to be better land, judging from the growth of the trees. The land has all been trenched two spits deep, the bottom spit broken and left in the position.

Apples, the fruit mostly grown, are mainly of three kinds: Bramley's Seedling, Cox's Orange Pippin, and Potts' Seedling. In one large bed they are arranged in rows of eighteen trees, six of each variety, and various experiments tried on them and the results carefully recorded.

Some of the most interesting to us were those made to prove whether shallow or deep planting is best, and as this is still a moot point in Australia, it will be interesting to know that here deep planting, that is a little deeper than the tree stood in the nursery, has answered best for apple trees.

Manuring is having a very exhaustive trial; the best result so far appears to be from using 10 tons of stable manure per annum. Where 30 tons to the acre was used in the first year the result was not so good, nor was it from various artificial manures used.

Experiments in pruning of apple trees have been carried out. They have been pruned when planted and the year after planting, and some left without pruning at all. There did not appear to be much difference between the first two methods: if any, in favor of the first; but the result of the no-pruning is decidedly bad, the trees having no shape at all. I am inclined to think that the deferring the pruning back until the autumn after planting would be worse in Australia than in England, owing to our drier climate. One of the most interesting experiments is that of cultivation; they are (1) mulching with straw, (2) grass grown round the trees, (3) the ground well dug with the fork and kept clean of weeds; and, fourthly, the surface only forked lightly to prevent the growth of weeds. Of the four methods the last appears to be the best and the third next; the mulching seems to have answered very well, but allowing the grass to grow about the trees, as is usual in nearly all the farm orchards in England, has only to be seen to convince anyone that neither healthy trees nor good fruit can be grown even in the moist climate of England: the difference between this experiment and the others being most marked, none of the trees being one-half the size of the others and the fruit very small.

It is possible that apples for cider may be better from orchards that are in grass, but certainly not for fruit for the kitchen or table.

Experiments are also being tried by grafting many kinds of apples in the Paradise and Crab stocks to show which is best. The Winter Magetin or Northern Spy do not appear to be used.

One set of trees that had been carelessly planted and the roots and tops not pruned did badly for the first two years, but subsequently they were pruned and manured and have most of them recovered and are now looking thrifty.

A large bed of pears of fifty-eight kinds are grafted on both the pear and quince stocks to show the difference in the two stocks, and twenty-six varieties of plums are grafted on six different stocks, those on the cherry plum or Myrobalan being the strongest growers.

Three half-acre plots near the main entrance are devoted to show how the land can be most profitably cropped by farmers, growers for market, and cottagers, respectively. In these dwarf trees are planted between those intended to remain permanently, also currant and gooseberry bushes between those again, and vegetables also in the cottagers' plot.

Experiments are also made in strawberry growing, also in potatoes and other garden produce. Many new and valuable kinds of fruit trees and a few ornamental shrubs, among which are some of our Australian trees, are introduced in the borders and fences.

Altogether this small farm is of great interest to fruitgrowers, and the Duke of Bedford has shown an example which other wealthy landowners would do well to follow, for their own good and for the world at large.

THE SUMMER TREATMENT OF LATERAL GROWTHS TO INDUCE FRUITFULNESS.

BY GEORGE QUINN.

At the Annual Conference of the Agricultural Bureau in Adelaide last September I drew attention to the advantages to be derived from a judicious application of this, by no means new, practice to induce apples and pears to form fruit spurs.

In most of our fruit-growing districts a great difficulty arises during the first few years after planting pear and apple trees owing to the hard pruning necessary to the proper shaping of the trees inducing a very rampant growth on the part of the lateral twigs. Many growers, noting this inclination towards the formation of much useless wood, have almost ceased to prune at all, thus encouraging a dense pendulous growth which does not produce any fruit for some years. Others, with a view to opening up the tree, completely suppress all of the laterals upon the main arms. These difficulties can be largely overcome by fracturing the lateral shoots in late summer, and thus transform them into short spurs, upon which fruits will be borne in a season or two. The process being simple is very rapidly performed, and much time saved in winter pruning to follow.

No definite time can be set down when to do the work, as much depends on the season and locality; but the condition of the growth on the trees to be treated is the most reliable guide. When the sap has reached its turning point and about to cease flowing actively is the time to do the work.

The laterals should be broken over the edge of a knife—not cut off. In Plate I. Fig. 1 shows the fractured lateral with the upper portion hanging down. The reason why the piece is left hanging is that it may continue to assist to a small degree in the vegetation of the tree. In this figure three buds are left upon the stub, and all or some of these will develop into fruit spurs. Fig. 2 shows a fracture of last year. The stub had two buds left upon it, and the lower one formed a short spur. The upper one grew about 4in. long, and has continued to grow at its terminal point this year, throwing out several spurs on its growth of last season. Fig. 3 represents a lateral broken too early, while the sap was quite active, and instead of forming spurs its top bud simply grew into a lateral about 18in. long. Such a result may occur when an unusual renewal of growth arises owing to a heavy summer rain. If the grower has

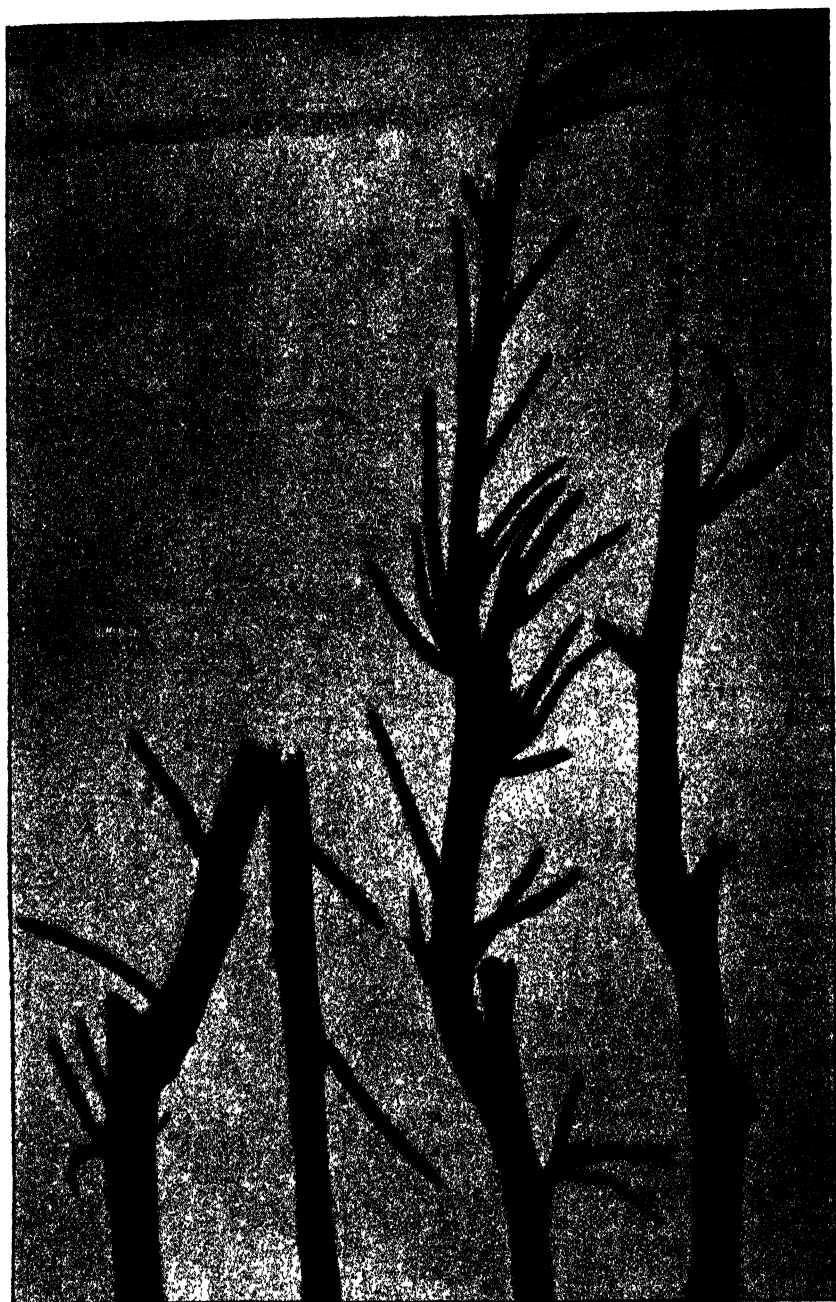


Fig. 1.

Fig. 2.

Fig. 3.

PLATE I.

time he could avert this by breaking these shoots a second time as the growth again slackens. Plate II. shows a somewhat unusual and unexpected development. The laterals of a Cleopatra apple tree growing in the Adelaide Lunatic Asylum orchard were broken late in January last. They developed most of

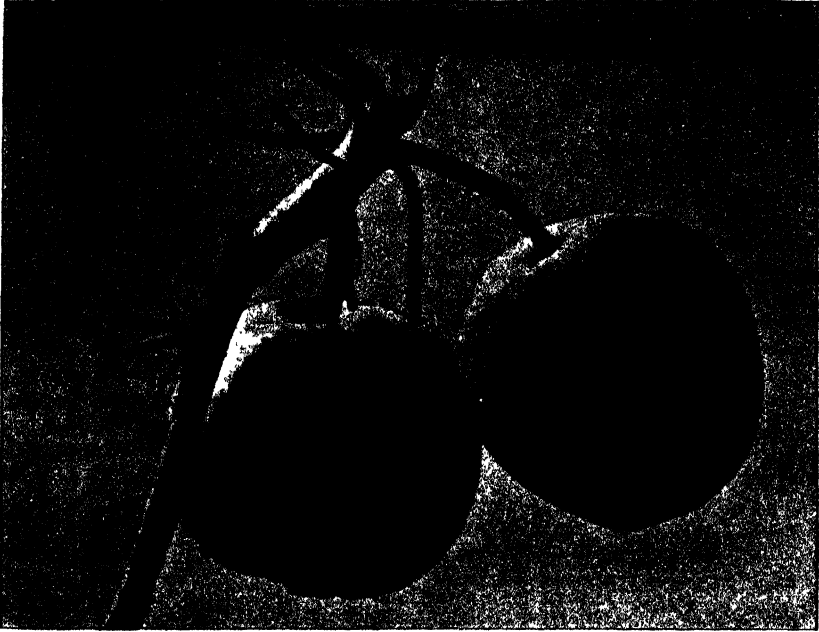


PLATE II.

the buds left upon the stubs, and in a number of instances the top spur bloomed and set fruit of a healthy normal character as shown in the illustration.

For the convenience of illustration the leaves have all been cut from the specimens, which are photographed natural size.

ORCHARD NOTES FOR JANUARY.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

We are now in the midst of the fruit harvest, and growers are comparing their returns and expenditure with considerable anxiety.

In most parts of the colony the fruit crops have been much injured by the hailstorms of a few weeks ago. The plums have "gummed" badly, and will, no doubt, be of an inferior flavor in consequence. Apricots, particularly on the weather side of the trees, are of a very doubtful quality, and it remains for the jammaker to discover how they are to be valued. For drying purposes there is little doubt but that the sulphuring will bleach the damaged spots back to the ordinary color, and a fair sample of the dried article obtained where the fruit has matured. The apples have been damaged, and the localities only affected by the early hailstorms are to be congratulated, as there is very little doubt of the sample yet being good, as most of the spots will fairly grow out of the later export and keeping varieties.

If rainy cold changes occur it is quite possible the scars may induce much splitting and loss, but given a fair proportion of cool weather, the fruits have

a good chance of "growing out" of the scars. I have been asked my opinion on the suitability of slightly-marked fruit for export, and am inclined to think that where the scars are few and merely brown surface scars, not endangering the keeping qualities of the fruits, they will be found profitable for export purposes.

It is gratifying to note the beginning of the apricot pulping industry in some districts, and when the immense area of country suitable for the production of this fruit is considered it is to be hoped the pioneers of the industry will be successful, and thus pave the way to its extension.

Now is the time for householders to put up supplies of fresh fruits for winter use by means of canning and bottling. The process is extremely simple, and the details quickly mastered by a little careful practice and observation. No elaborate appliances are required. The writer has cut an empty kerosene tin through lengthways, and found it an excellent bath in which to cook the contents of the cans. Six ordinary cans just fill this bath, and prevent any danger of the cans capsizing in the water when being handled.

I will repeat in short the methods found successful. With the exceptions of plums and clingstone peaches all stone fruits are halved, stoned, and wiped clean of any dust or outward substance. Peaches should be peeled, as in the cooking the bitter flavor of the skin is intensified, or infused into the pulp and syrup. If the fruit is first plunged for a moment into boiling water the skin is easily removed.

Apples and pears are peeled, cored, and quartered. The fruit should be very carefully graded into the various stages of ripeness when it is being manipulated, so that the canner may judge the cooking to a more accurate degree, as this is the most important item in the production of a first-class article.

Having been prepared in a suitable manner, the fruit is packed carefully into the cans or bottles and placed in the bath. The water in the bath, which should reach within an inch of the top of the cans or bottles, is then heated to boiling point and the contents of the tins or jars heated through. Syrup is then prepared in a separate vessel by dissolving from 2lbs. to 4lbs. of best crystal sugar in each gallon of water; the strength is decided by the taste of the canner or the sweetness of the fruit under treatment. This syrup should be boiled for a few minutes and any deleterious matter skimmed from its surface from time to time as it rises. The boiling syrup is then poured into the cans or bottles containing the fruit, and the boiling of the bath continued for a time which can only be determined by experience.

Ripe, soft apricots are cooked in from three to five minutes, and pears will require from fifteen to thirty minutes. A beginner had better test the cooking of the fruit with the pressure of a spoon or some instrument and thus discover how the softening is proceeding. When cooked the lids of the cans or bottles should be fitted and closed carefully. The tins should have a little beeswax run into the rings where the lids and cans are in contact. This assures the exclusion of air. Care must be taken to see that the vessels are closed while very hot—at any rate not below 160° Fahr.

More care must be exercised in handling the bottles, and in all cases a rack—I use wire netting cut to fit in the bath—should be used to prevent the bottoms of the cans or bottles resting on the bottom of the bath. In the case of glass vessels straw envelopes or cloths must envelope them to prevent breakage. The writer has used both kinds of vessels, viz., tin and glass, and most certainly advises beginners to buy glass jars, as they are cheaper in the long run. In the hands of careful people they last many years. The tins are not to be relied on for more than one season. Any one may test if the vessels are closed perfectly airtight by allowing them to cool somewhat

and then standing them upside down in pretty hot water. The hot water expands the air within and causes it to issue in bubbles from any that are not airtight. These leaking vessels should be heated over again and reclosed.

Early pears and apples will be marketed, and in orchards infested by codlin moth great care should be taken to avoid packing infested fruits, as the seller is liable to prosecution.

Bandages upon apple, pear, and quince trees should be carefully examined once each week, and all codlin larvæ or pupæ destroyed. Sprayings may yet be made with Paris green upon late sorts.

All orchardists, especially those residing in clean districts, should insist upon scalding all strange fruit cases that may be suspected to have come from infested localities. Growers should combine and insist upon owners of factories supplying them with clean cases only.

The summer pruning of pears and apples will in some districts be done during this month. This is dealt with in an illustrated article elsewhere in this issue.

Budding will be in full swing now. The only natural essential is a free flow of sap; the remainder rests with the operator. It is not advisable to force the buds into growth now, but rather allow them to stand dormant till next spring. The ties should be removed from any limbs where buds have united with the stock.

Citrus trees may be successfully transplanted if a ball of earth is secured on lifting the roots. A good mulch and watering is necessary.

FRUIT INDUSTRY OF CALIFORNIA.

Some idea may be gained of the magnitude of the fruit industry of California from the following statistics of the 1897-8 harvest taken from the *California Fruitgrower* :—

<i>Exports.</i>	
Fresh deciduous fruit	145,250,000lbs.
Citrus fruits	191,352,000lbs.
Cured fruit	176,890,000lbs.
Canned fruit	146,940,000lbs.
Raisins	78,100,000lbs.
Wine	14,875,000galls.

The citrus fruits shipped were valued at about £1,300,000, and the freight alone amounted to £900,000. About £150,000 was paid for boxes.

The output of cured fruit was 50,000,000lbs. above the previous record. It is estimated that it takes of fresh fruit to make 1lb. of cured 5lbs. to 6lbs. of apricots, 4½lbs. to 6lbs. peaches, 7lbs. to 9lbs. pears, and 2lbs. to 3lbs. prunes. Prunes constitute considerably more than half the output, apricots and peaches coming next, with about one-sixth each of the total. In 1890 California produced only 16,000,000lbs. of prunes, while in 1897 the output was 97,780,000lbs. It is estimated that 116,000 acres have been planted with prune trees. This is exclusive of plum trees.

The raisin crop totalled 93,704,000lbs., of which, as will be seen, about five-sixths were exported. The California Raisin-growers' Association, a co-operative concern formed for the protection of the growers, handles 95 per cent. of the output.

The apple export was less than one-third of the previous season's figures, which were, however, exceptionally high. The total was about two and a quarter million bushels.

The year's output for canned fruit was nearly two millions of cases of 60lbs. each, valued at £1,000,000. The value of the canning industry to other persons

than the grower is shown by the fact that the fresh fruit used makes up less than one-half of the total value. The tins alone cost £230,000, labor £150,000, sugar £90,000. The pack of vegetables was 430,000 cases of 60lbs. each, three-fourths being of tomatoes. Of fruits, peaches make nearly two-fifths of the pack, Bartlett pears and apricots coming next, each with a value of about one-sixth of the total.

The wine production for 1897 was 34,000,000—an unusually heavy crop. The 1898 vintage, not yet completed, is, however, not expected to yield much more than one-fourth of this amount, the principal cause being the very dry year following the previous heavy crop. The shipments of wine for 1897 were valued at £1,150,000. Of brandy, 1,442,168 galls. were manufactured.

The olive crop for 1898 is almost a failure, while the European crop is also reported to be short. In California there are about 2,250,000 olive trees, and the annual production of oil is about 150,000 galls.

NOTES ON VEGETABLE-GROWING FOR JANUARY.

By GEORGE QUINN.

The warm weather experienced during the middle of December has caused a fair growth of many summer vegetables which previously had been almost at a standstill owing to the many cold changes and hailstorms. After the first setting of early tomatoes the plants almost ceased to bloom, but now they have apparently returned to a normal condition. These plants should be tied to stakes or kept off the soil, though not raised too high, as the warmth from the ground seems to induce early ripening of the fruits. Occasional soakings should be given, but these should be regulated by the growth. Plants growing too vigorously should be stinted a little to induce blooming.

Melons and cucumbers require abundance of water, and a good mulch of fresh stable manure spread around and saturated with water acts as a stimulant. In windy places the runners should be secured by pegs from blowing about.

Onions should be harvested; and careful handling is very necessary in this work. The onions should not be stored away when very hot, as this induces early decay. The different sorts should be kept apart in the store, as they rarely possess the same keeping qualities.

Potatoes must be harvested as soon as ready to avoid injury by the caterpillars. Anyone having a bag or two attacked by this pest should spread them loosely in an airtight box and put a saucer containing an ounce or two of carbon bisulphide on the top; close the lid, and the bisulphide will pass into a gaseous form and stifle the pests in an hour or two. The tubers should be exposed to the air for some hours after.

Successional sowings of dwarf and runner beans should be made at intervals of two or three weeks to keep up a supply of pods.

Seedbeds should be prepared and sowings made of cabbage, cauliflower, and celery made so as to be ready for planting out in autumn. A shallow pit, made by throwing out the first spade "spit," will do. The soil is enriched by a good compost of manure and loamy soil being added. The surface is made perfectly level to avoid washing to one corner when watering. The seeds are sown and covered with finely-sifted manure, after which a good soaking is given with a finely-pierced rose on a watering can. The sides of the pit should be kept up with boards, and a top made of laths or split palings nailed to a skeleton framework answers the purpose well.

Growing crops of beet, parsley, lettuce, mustard, radishes, asparagus, rhubarb require abundance of water, and a good mulch of manure upon the surface is an essential to success.

WEATHER AND CROP REPORTS.

BORDERTOWN.—The weather has been very warm with cool southerly winds at night. Farmers are busy reaping; the grain has filled out well owing to the late spring rains, and bids to yield rather above the average, the result of the use of the seed and manure drills. The hay crops returned from $\frac{2}{3}$ of a ton up to 3 tons per acre.

COROMANDEL VALLEY.—The weather generally this month has been unfavorable for hay-making and for the fruit crops. Heavy winds and storms of hail and rain have done considerable damage.

KANMANTOO.—We have had very unseasonable weather for December, and the harvesting operations have been considerably delayed.

KAFUNDA.—Reaping is nearly finished, and the crops have yielded better than was expected. The rough weather has shaken out a lot of grain in the heavy crops where three or four bags to the acre are still left to be reaped. Where the crops were blighted in September very little was shaken out by the wind. The sample is good, being much improved by the cool damp weather we had in October. There appears rather more smut than usual this season; in some cases one side of the ear is good grain and the other side of the same ear is smutty.

LIVSON.—Weather continues favorable for reaping, which is rapidly drawing to a close. The average will be equal to last year, but the sample will be better, especially from some of the late crops, which have greatly benefited from the late rains.

MENINGIE.—The weather during last few weeks has been very unseasonable, the heavy and continuous winds and rain squalls having considerably delayed harvesting operations, and damaged the grass paddocks. Rainfall at Meningie for eleven months, 17.2 in.; at East Wellington, 12.77 in.

MORPHETT VALE.—Owing to favorable weather lately, the wheat crops are turning out well, though it is too early yet to give any statement as to yields. The vineyards are slowly recovering from the effects of the hail. The crop throughout the district will be light, though the second crop is unusually heavy. Prices for grapes have advanced. Fruit crops are comparatively unimportant and mostly inferior in quality, being injured by the hail.

PINE FOREST.—We have had favorable reaping weather, and most farmers will soon have finished stripping. The yield in most cases is up to expectations. Stock in fair condition. Fruit crop very light. The water question is becoming a very serious matter, most farmers being dependent upon Beetaloo.

PORT GERMEIN.—Harvest operations are almost at an end, and the result of the year's work is far from satisfactory, both as regards yield and price. Much straw is being saved, also wheat chaff, as the hay crop was not abundant. The rainfall for the year was under 9 in.

RIVERTON.—Reaping is in full swing, many farmers putting on extra machines to take full advantage of the favorable weather. The hay harvest was very satisfactory, but a smaller area than usual was cut. The late-sown wheat benefited considerably from the November rain.

SADDLEWORTH.—The strong winds on the 4th and 5th inst. caused a good deal of wheat to shed out, especially Steinwedel and other early varieties. Reaping is general; many crops are ripening unevenly, but the grain is good and the yield will be satisfactory though little has yet been cleaned. Sorghum is very backward, and all feed dry.

YORKTOWN.—Farmers are busy reaping. The fertilised paddocks are estimated to average from 10 bush. to 12 bush., those not manured, only about half this. Fruit crop, light. Stock looking fairly well.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

December 23, 1898.

During the early half of the month unusually cool weather for December was experienced, and although we have had a couple of hot spells since, the mean temperature will probably, like the previous month's, come out considerably below average. Growing feed is, generally speaking, plentiful.

Business has been fairly brisk, partly as a result of the steady improvement in the prospects, particularly in the later agricultural districts of the colony, the usual impetus given by the holiday trade also contributing largely.

Since our last value of wheat has steadily declined; the heavy yield in the Argentine previously reported being backed up by an almost record harvest in Russia, although some of its provinces had, as already intimated, practically failed. Under these circumstances operations in Australia on English account have been very limited, and it appears as if the rate quoted in last, namely, 30s. 3d. c.i.f. London, is now unobtainable, although some charters for United Kingdom have been effected, and a couple of vessels engaged to load flour for South Africa, where we have to face American competition at prices certainly not higher than rates at present ruling here. As our harvest progressed the beneficial effects of the cool

weather became very apparent, and the quality of the samples now coming to market leaves but little to be desired, many from the later districts reaching 65lbs. to 66lbs. per imperial bushel. The Victorian and New South Wales markets, under the same influences as our own, have receded, but not to the extent of ours; and the disappointing results from the western districts of New South Wales has so far prevented that market from reaching the level of export values. In millers' offal lines there has been a heavy demand for bran and pollard, but, as anticipated, quotations in these begin to show weakening tendency. In forage lines business has been a little more active, Sydney starting to operate here for chaff, but not sufficiently to affect values, the future of that market depending, as usual, upon January rains. Oats are moving a little more freely, but price as yet shows no improvement, the apparent local supply being sufficient for at least some months to come.

Potatoes are more plentiful, although crops from the plains have been digging light, but in the hills returns are likely to be more satisfactory. In the Mount Gambier district the yield will not be heavy, although late crops will probably give more than was expected a few weeks ago, as a result of the continuance of favorable weather. Onions are being marketed in quantities equal to demand. Price has eased a little, but ought still to be high enough to satisfy local growers.

The continuance of unseasonably cool weather up till a few days ago has kept growing feed in better condition than expected, so that supplies of milk have decreased more slowly than is usual at this season of the year, and is still providing enough to give a surplus of butter available for export, although during the last few days a rise in value of local prints makes this market higher than Victoria or New South Wales, due however, to the usual brisk increase in demand leading up to the Christmas holidays, after which we may expect at least a slight easing. A glutted egg market during all the month in West Australia, our chief export outlet, has brought about most unexpected conditions locally, values continuing to recede in spite of prognostications to the contrary, and of the higher rates ruling in Sydney and Melbourne. Usually at this time of year the Adelaide market, owing to its proximity to West Australia, is 1d. to 3d. per dozen higher than the more eastern colonies; but the position at moment is reversed, and from this hopes are entertained that it will settle down to normal conditions with the beginning of the year.

In cheese a fairly heavy month's business has been put through, but the anxiety of some makers to turn as much of their stocks as possible into cash has caused an easing in value of the line. Bacon is also a shade lower; demand, however, being increasingly heavy, present quotations are very likely to hold. Hams, being a seasonable line, have been readily dealt in, and are somewhat scarce. Honey is a little more plentiful, but prices remain unaltered, better enquiry having set in. Almonds scarce, and in consequence very saleable. Heavy catalogues of poultry have been penned at each sale during the month, but demand has proved active, resulting in quitance, particularly of well-conditioned birds, at rates very satisfactory to consignors, geese especially ruling high.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, new, 2s. 7d.; outports, 2s. 5d. to 2s. 6d. per bushel of 60lbs.
 Flour.—Old, £8; new, £7 5s. per ton of 2,000lbs.
 Bran.—7½d.; pollard, 8d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 5d. to 1s. 7d.; stout white, 2s. 3d. to 2s. 9d. (imported, nominal), per bushel of 40lbs.
 Barley.—Malting, 4s. to 4s. 3d.; feeding sorts, 1s. 8d. to 1s. 10d. per bushel of 50lbs.
 Chaff.—£2 10s. to £2 15s. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—New local, £6 to £7 per 2,240lbs.
 Onions.—£4 10s. to £5 per 2,240lbs.
 Butter.—Creamery and factory prints, 10½d. to 1s.; dairy and collectors' lines, 7d. to 9d. per pound; best bulk factory, 9d. to 9½d., chilled, f.o.b.
 Cheese.—S.A. Factory, large to loaf, 6d. to 7½d. per pound.
 Bacon.—Factory-cured sides, 7d. to 7½d.; farm lots, 6½d. to 7d. per pound.
 Hams.—S.A. factory, scarce, 8d. to 11d. per pound.
 Eggs.—Loose, 6½d.; in casks, f.o.b., 7½d. per dozen.
 Lard.—In bladders, 5½d.; tins, 4½d. per pound.
 Honey.—2½d. for best extracted, in 60lb. tins; beeswax, 1s. 1d. per pound.
 Almonds.—Soft shells, 3½d.; kernels, 10d. per pound.
 Gum.—Best clear wattle, 2½d. per pound.
 Poultry.—Very small and poor conditioned fowls, 9d. to 1s. each; fair hens and light cockerels, 1s. 1d. to 1s. 6d.; prime roosters, 1s. 10d. to 2s. 4d.; small to good ducks, 1s. 6d. to 2s.; prime table sorts, to 2s. 6d.; fine heavy geese, 4s. to 4s. 6d.; poor and light, 2s. 7d. to 3s. 6d.; pigeons, 5d.; turkeys show a wide range, poor to ordinary selling, 5d. to 7d., fine birds up to 10d. per pound live weight.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, DECEMBER 14, 1898.

PRESENT.—Mr. F. E. H. W. Krichauff (Chairman), Sir Samuel Davenport, Hon. A. W. Sandford, M.L.C., Messrs. Samuel Goode, W. C. Grasby, Thos. Hardy, H. Kelly, J. Miller, T. Price, and Acting Secretary (Mr. W. L. Summers).

Branch at Morphett Vale.

The formation of a Branch at Morphett Vale with the following gentlemen as members—Messrs. L. F. Christie, T. Anderson, J. Spriggs, J. McLeod, J. Perry, and A. Ross Reid—was approved.

Welcome to Mr. Thomas Hardy.

The Chairman welcomed back Mr. Thos. Hardy, who has been absent on leave for nearly eight months, and referred to his willingness to at all times give other growers the benefit of any information he is possessed of. Other members supported, and Mr Hardy in thanking the members said he looked upon it as a duty to give any information that he might acquire that was likely to be of value to the colony. He also read the following notes on his trip:—

At Natal there is a market for flour, preserved and frozen meat and rabbits, apples and pears and canned fruits, wine, and brandy, but if the Customs union between Cape Colony, Orange Free State, and Natal is carried out, and it is most likely to be, then both wine and brandy will be quite shut out. There seems to be a great scarcity of stock of all kinds, and for several hours' journey from Durban towards the Transvaal we did not see any cattle at all, and yet there was grass knee high all over the country. Whether there may be a market for live stock from Australia I cannot say. Johannesburg is supplied with wine and brandy for the colored people and others from Cape Colony, but the wealthy people all drink French wines, so that there is very little show for Australian produce. There is cool storage both here and at Natal in private hands. There is very little agriculture near the line, and farms are very far apart. What little cultivation there is about the farmhouses is for maize and pumpkins. Plenty of the land looks good enough to grow wheat, and no clearing required, but they say that red rust and locusts prevent them from growing it. There are no fences until we get into the ostrich farms in Cape Colony, and no timber trees except those planted. The Australian gum and other trees flourish splendidly. The old style of sheep with the fat tails once used to see at the Cape are dying out, and not many seen in the butchers' shops. Horses are dear; both carriage horses and good useful dray and cab horses are in demand. It seems a wonder that a country with such an unlimited scope of open land should have to import cattle or food, but so it is. Flour has always to be imported, and at present there is a good demand for frozen meat.

In England we found the crops wherever we went very fine, both cereal and root crops, and the hay harvest had been an abundant one. The railways afford great facilities for farmers sending dairy and other produce to private customers, and they are largely made use of. We found Australian and New Zealand meat on sale in all the large towns, generally in shops dealing only in imported meat. Lamb was nearly always ticketed up as "Prime Canterbury," and sold at very moderate prices, from 3d. per pound and upwards. At Bedford we went over the splendid works of J. & F. Howard, agricultural machinists. They were very busy executing orders for hay and straw baling machines for Germany and Belgium. They had one at work for me to see. We also visited the Duke of Bedford's experimental fruit farm near Bedford, and what we saw there will form a paper for the *Journal of Agriculture*.

On our return to Australia through France we had a good opportunity of seeing wine-making in the Burgundy country. Also at Tunis vine-growing on a large scale, and the fattening of cattle in houses. In this country, which is subject to droughts like ours, a species of prickly pear, but entirely without spines, is grown and kept as a reserve of feed for cattle and sheep, and may become valuable for the same purpose in Australia, as it grows in poor, sandy land, and requires no cultivation. There is a large kind also grown bearing a very fine red fruit which is much used, and I have brought leaves of both kinds, and Mr. Holtze has kindly taken charge of them.

Reserve Fund for Farmers.

At the suggestion of the Chairman, it was decided to ask Mr. J. von Ber-touch, Chairman of Eudunda Branch, to furnish particulars of scheme adopted by the Branch to provide a relief fund for distressed farmers.

Farmers' Reunion.

The CHAIRMAN called attention to question of social gathering or reunion of members of the Bureau during Congress proceedings in September. It was decided at Congress that the Central Bureau should see what could be done in the matter, and he thought it time they considered it. Considerable discussion ensued, the general opinion being that the meeting should take the form of a conversazione. Various items of interest to farmers, stockowners, fruiterers, etc., could be shown by means of microscopes, interspersed with music and singing. It was agreed that it was important that the members of the various Branches should be made acquainted with one another, and that a social evening as suggested would bring about this, and would also be instructive and entertaining. A committee consisting of Messrs. Grasby, Hardy, Price, Sandford and the Secretary, were appointed to draw up a report on the matter.

Horticultural Instructor.

The CHAIRMAN inquired whether anything had been done in regard to resolution of Congress asking that the Inspector of Fruit should be relieved of some of his duties in town to allow him time to visit country districts for the purposes of instructing horticulturists in pruning, budding, &c., of fruit trees, treatment of insect pests, &c. It seemed to be the general opinion that Mr. Quinn's services should be utilised in this way. The Acting Secretary reported that the resolution of Congress had been conveyed to the Hon. Minister, but no reply had been received. It was decided that the Chairman interview the Minister on the subject and urge him to give effect to the resolution of Congress.

Standard Weight of Wheat.

Mr. MILLER asked whether anything could be done by the Bureau to induce the Chamber of Commerce not to raise the standard weight of wheat this season. It was the general opinion that it was intended to raise the standard, and great dissatisfaction was expressed in his district. The wheat, although of good milling quality, was in most cases only 62lbs. or even under. There was also a very great injustice done in the deduction for wheat below the standard weight. This season 6d. per bushel had been deducted because the sample, though of fair milling quality, had failed to reach the standard by one or two pounds. Such a severe deduction was not justified.

Mr. SANDFORD said there was somewhat of a misapprehension as to the fixing of the standard weight for the season. The Chamber of Commerce went on defined lines, uniform with the other colonies, and it was useless asking them to depart from the regular way of fixing the standard, which was done in the following way. Fair average samples were obtained from as many localities as possible, and he believed the Branch Bureaus were invariably invited to co-operate by forwarding average samples of their respective districts. These samples were all mixed thoroughly, and a measured sample struck from the bulk, and the weight adopted according to this sample. There was no doubt that the wheatgrowers should be represented on the committee which took the necessary steps to fix the standard weight for the season. The growers should also take action to force the buyers to state the reduction per bushel for each pound under the standard. Under present conditions they were at the mercy of the buyers, but he believed that they could do some good by insisting on this point.

It was decided that Messrs. Sandford and Miller wait on the Secretary to the Chamber of Commerce and see whether anything could be done in the matter.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical Papers:—

258. *Butter* is judged at exhibitions in Germany by points viz.:—For taste (aroma and salt) 50 points; for smell, 10 points; for quantity of water and milk 20 points; for appearance (cleanliness and color), 10; for hardness and spreadability 10.

259. *Sylvinit*.—Professor Dr. Maercker has, with the assistance of others, made full experiments with this raw potash salt, largely exported to England, and found that it can be used as a substitute for kainit. Chemically it contains about 1 per cent. more potash, but also an average about $4\frac{1}{2}$ per cent. more sodium chloride (common salt). With barley and most other experiments sylvinit gave a somewhat larger crop of grain and less potash in the straw; and this was the case with less sylvinit in proportion to equalise the potash with that of kainit. The plants did not take any more chlorine from the sylvinit. The potash proved to be quite as soluble.

260. *To obtain the most Valuable Timber*.—High Counsellor of Forests, Judeich, states that before you remove the bark from the felled tree let it lie for some days with the full top. The leaves or the needles of pines will draw the sap as before from the stem and exhale the moisture. Best of all he thinks is to take the bark off, and to fell the tree only after one or two years. Teak is cut in that way, and only such timber was taken for the French navy in the last century. I have found that trees cut down and split at the end of summer gave me the most durable posts and rails; many redgum posts containing no light-colored wood, more than forty years in the ground, have been found still sound, although the wood above ground proves rather brittle.

261. *New Square-head Wheats*.—These require for a full crop plenty of plant food, and amongst it nitrogen in large quantity. Such is the report on experiments made in 1896 by Professor Dr. Maercker at the Lauchstadt Experimental Station. These wheats ripened respectively in from 294 to 301 days, and Rimpan's Bastard Square-head gave by far the largest crop of grain, viz. 63bush. per acre, and ripened in 294 days or six days earlier than many others. All the seven new were much ahead of the old square-head wheats as well in straw and in grain; the average was 6bush. more per acre without one penny more in costs. In spring all received as top dressing 1cwt. nitrate of soda per acre, but even this may not be quite enough unless you are afraid of the wheat layering. Where the wheat had not sufficient potash and phosphoric acid the crop was of course much less.

262. *Mold's Red Frolic* has been found the best wheat as tried in twenty-seven farms in Germany against five other wheats. Mr. Weber only gives the quantity harvested from rather light soil, viz., 26cwts. per acre. "Dividend" wheat was next with nearly the same quantity, but Mold's was much heavier, and received also the first price for its flour and bread. Mr. Weber, who grew two and a half acres with each of the six sorts, had the land manured with farmyard dung the year before. For the wheat he used 4cwts. of kainit, which he ploughed in 7in. deep, and put 4cwts. of superphosphate on the rough ploughed furrow. In spring he gave in three doses 2cwts. of nitrate of soda per acre. He says the square-head wheats prove to be the best sorts in heavier soil, but not so in lighter soil.

263. *Horses Poisoned with Diseased Potatoes*.—*The Journal of Pathology and Therapy* states that of fifteen horses, eleven died that had been fed, besides their usual food, with steamed, but in part mouldy, partly rotten potatoes, for ten to twelve days. At another time two horses also died after ten days. The fungi had caused the bowels to become inflamed.

264. *Professor Maercker Potatoes*.—This has been received by me by November mail. Mr. P. Schmidt, of Mueson, found that it produced from 100lbs. planted 12·20cwts. in light, but well manured, sandy soil, after green manuring and farmyard dung; while he received from three other new sorts respectively 10·80cwts., 7·60cwts., and 7·30cwt. Another had from 350cwts. planted in the lightest soil, but in good heart, 3,750cwts., or nearly eleven fold; and Professor Dr. Eckenbrecher testifies, after he had cultivated it four years, to its extraordinary high productiveness and contents of starch in good and bad years and in all situations. Mr. Breustedt had in five years never a diseased potato of the "Professor Maercker," but he thinks that it is not good for very clayey soil. Commercial manures are much used where farmyard dung is not plentiful, and even where the latter is used some phosphatic and potassic manure should be given. Without farmyard dung from 2cwts. to 3cwts. of nitrate of soda per acre should be used, in two doses, at planting and as soon as appearing on the surface. Two hundredweight of superphosphate and of muriate of potash or, better, of somewhat less sulphate of potash, may be also given per acre.

265. *Vicia Dumetorum*.—The hedge vetch is specially recommended by Mr. E. Quasthoff, after he had experimented with a number of other species of vicia, as actually superior to lucern. It will grow where lucern will grow, and remarkably quick. He counted frequently more than eighty shoots, which grew up to 6ft. high. Cattle like it either green or dry, for it contains no bitter matter, and a crop of it may exceed in quantity that of all other fodder plants. It must be sown (as it does not stand transplanting) about 6in. apart, and requires about 12lbs. of seed per acre. Lime, potash, and phosphoric acid are necessary for a good crop.

266. *Willows*.—Mr. Grans, of Western Prussia, writes as regards the more recently commenced cultivation of willows there, that it is a mistake to believe that they will not grow and give a profit on dry and light sandy soil. Whilst the longer wands command from M8 to M12, the thinner and shorter bring from M18 to M20. The soil receives 4cwt. of kainit when it is trenched to 1ft. 8in. deep by turning the surface down. The sets are 10in. long for clay soil, 14in. for dry, sandy soil, and put in rows distant 1ft. from another and 4in. apart, the top being 1in. under the surface. Hoeing is necessary, and also twice a topdressing of 1cwt. of nitrate of soda each time.

267. *Amount of Water required by Crops and Conservation of Soil Moisture*.—Professors Hilgard and Loughridge made experiments in the very dry season of 1897-8 to study the limits of endurance of drought of several plants. It had been elsewhere previously ascertained that from 300 to over 500 tons of water are, on the average, required to produce 1 ton of dry vegetable matter. In Wisconsin a 2-ton crop of hay required over 1,000 tons of water per acre, equal to about 9in. of rainfall. The drought and intense heat of five or six weeks would frequently destroy a crop in the eastern states of the United States of America, which are endured in the Californian dry climate for as many months. The main cause is to be found doubtless in the much deeper rooting of all plants in arid climates, whereby not only a much larger bulk of moist soil is at their command, but the roots are withdrawn from the injurious effects of the hot dry surface and air. In eastern soils the roots find more difficulty in penetrating subsoils, and often little nourishment, on account of their density and rawness, or they may be too wet. In arid regions, as a rule, subsoils are practically the same as the surface for several feet, due to the slight formation of clay and the rarity of heavy rains, which implies that they are well aerated and therefore not raw. There are two plates, giving the root-system of fruit trees in a moist and in an arid climate. In the former the roots are running nearly parallel with the surface, while in the other they penetrate to a great vertical depth. It is now clear that it is also here to the interest of farmer and gardener to favor to the utmost this deep penetration of the roots, both in the preparation and tillage of the ground and in the use of irrigation water, where such can be applied. For if the latter is used too frequently or too abundantly the salutary habit of deep rooting will be abandoned by the plant, and it will be dependent upon frequent rain or irrigation, and will require also frequent and abundant fertilisation of the shallower bulk of soil in which it roots. The deep soil of arid climates gives a triple and quadruple acreage of arable soil under the feet of the owners, which should prevent shallow ploughing and thereby form a "ploughsole" that prevents root penetration, and thus limits moisture and plant food. In that case crops must succumb to a slight stress of the season, which might have been passed without injury had the natural conditions been taken into due consideration. We observe here also frequently trees flourishing in very shallow soil: but slate or shales standing on edge permit the roots to reach permanent moisture at great depths, and the surface being kept loose, but little, if any, rain will run off. It being stored there, especially vines might benefit, if large funnel-shaped pits are opened around them, as they make them on arid slopes in California, where no natural vegetation find a foothold, and yet the choicest raisins are grown. Similarly the "ryots" of parts of India water by applying to each plant immediately around the stem such scanty measure of the precious fluid as they have taken from wells, often of considerable depth, which form their only source of water supply. Such basin-irrigation may, however, frequently produce injurious effects upon trees: the cold water depresses too much the temperature of the earth immediately around the roots, and thus hinders active vegetation so as to bring about perhaps dropping of the fruit. A reservoir to warm the water before applying it (if well or tap water) is therefore very desirable. Furrow irrigation does not reach the roots before the water has been warmed up by more soil, and does not reach the main roots in quantity, if at all, and the water does not sink so readily down near the trunk or stem of any plant. The water being scarce and warm, it can be best applied in a circular trench, otherwise furrow irrigation is preferable, and flooding, if the temperature of the water is not too low. In the two latter cases, unless irrigation is practised rather sparingly, it may happen that the gain you make *horizontally* is more than offset by a corresponding loss in the *vertical* penetration of the root system. Thus the cry for fertilising orchards and orange groves is due quite as much to the shallowness of rooting induced by over-irrigation. The roots are induced to come and remain at the surface within 18in. or 20in. Had deep rooting been encouraged at first, instead of over stimulating growth by surface fertilisation and frequent irrigation, some delay in bearing would have been amply compensated for by less outlay for fertilisers and less liability to injury from any unavoidable delay or from inadequacy of irrigation.

Alongside of economy in the use of water the conservation of moisture either from rain or irrigation is most important, and yet the storage of it, which settlers can command without the use of reservoirs within their own soil, is not sufficiently utilised. The running off of the rainwater where the rainfall does not exceed 25in. a year is a dead loss. Fallow ploughing wherever the land is not naturally sufficiently absorbent, and is not thereby rendered liable to washing away, is a very effectual mode of utilising the moisture of the later rains of winter and of our spring to the utmost, and causing them to moisten the subsoil to as great a

depth as possible. A knowledge of the subsoil to at least 4ft. deep is however necessary to judge of the time and of the amount of water required by irrigation to wet the soil to a certain depth. One or a few bores or holes dug should be sufficient to settle this question. In sandy lands it may easily happen that when ditches are too far apart the water near the head ditch is already gone down to 10ft. or 12ft. before any has reached the end of the furrows, or has wetted the lower half adequately. But supposing the moisture to have reached the depths of the soil, whether from rains or irrigation, you must prevent evaporation by a mulch, and the best is a surface layer of loose well-tilled soil. The omission of cultivation even in the loose generous soil of Alameda Creek, compared with adjoining lands with the same soil cultivated to an extra depth to conserve moisture, showed that apricot trees in the first case made only a growth of 3in. against over 3ft. where the soil was so cultivated, and the fruit was three times as large. The first foot contained 42 tons more water per acre, the second foot 28 tons more, the third foot 50 tons more, the fourth foot 28 tons more, &c. The cause of this difference was that in the uncultivated field there was a compacted surface layer several inches in thickness which forcibly abstracted the moisture from the substrata and evaporated it from its surface, while the loose surface on the cultivated ground was unable to take any moisture from the denser subsoil. A dry brick will suck a wet sponge dry, but a dry sponge (corresponding to the loose surface soil) is unable to take any water from a wet brick, and the tilled surface forms a non-conducting layer protecting the subsoil from the sun's heat and dry air. In the East and the Old World such a layer 3in. thick is effective, but in arid regions it requires 6in. and more to be a protection against a drought and heat of five or six months at a stretch. While unploughed land is as bare as a barn floor, weeds appear on the summer fallow, due to the conservation of moisture under the tilled surface.

268. *Phosphoric Acid Wanted*.—I find in the agricultural paper for Oldenburg that the necessity for supplying the soil with phosphoric acid where farmyard dung is used is again noticed. In 10 tons of dung may be only 40lbs. of phosphoric acid, much of which may be consumed for the crop which precedes the grain crop (for which direct manuring with it is not advisable). A cereal or pea crop removes, however, in the grain and straw frequently 60lbs. of phosphoric acid. Rape and potatoes require twice as much phosphoric acid as is usually contained in manuring with farmyard dung. To add 24lbs. of phosphoric acid per acre is required to obtain a full crop, which is contained in 4cwt. of superphosphate of 15 to 16 per cent. or 2½cwt. to 3cwt. of bonedust, or in 4cwt. of Peruvian guano, or in 4cwt. of 15 per cent. Thomas phosphate.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Mount Compass, Mr. G. Cameron; Forster, Mr. T. Prosser; Millicent, Messrs. W. H. Rich and — Wardell; Mannum, Mr. R. Heidrich; Hawker, Messrs. R. Wardell and James O'Loughlin; Renmark, Mr. J. A. Gibbins; Meningie, Messrs. Thomas Joy and F. Tiller.

Reports by Branches.

The Acting Secretary reported receipt, since previous meeting, of forty-four reports of Branch meetings.

REPORTS BY BRANCHES.

Hawker, November 23.

Present—Messrs. C. A. Hirsch (Chairman), J. W. Schuppan, F. C. Hirsch, H. M. Borgas, J. Edgeloe, C. W. Pampa, T. Laidlaw, J. Smith (Hon. Sec.), and one visitor.

SELECTION OF SEED WHEAT.—The Hon. Secretary read a paper on this subject. He urged the necessity for careful selection of seed, to which farmers generally did not pay sufficient attention. He had had fourteen years of farming in the North, and it always paid him best to sow early wheats. On their white land he would sow early Purple Straw or Red Straw. Smart's Purple would also do well on these soils. On the red lands he would sow Steinwedel, Velvet Pearl, and King's Jubilee. Allora was also worth a good trial. There was more in selecting seed according to the soil than most farmers imagined, and by attention to this matter they might considerably increase their returns.

Bearded wheat never gave such results with him as were obtained by others in the district; consequently he did not now grow it. Mr. Laidlaw said he received better returns from Steinwedel than from Allora. Mr. F. C. Hirsch had proved that new seed from other districts did not yield so well the first year as the second. The Chairman said his experience was the same. Mr. Borgas tabled grain of Norman's No. 5 and Bearded wheat from drilled plots, the former being the better sample.

FRUIT PEST.—Members reported their trees and vines being eaten by a night-feeding caterpillar. [Use the Paris green, bran, and treacle mixture.—GEN. SEC.]

Golden Grove, November 20.

Present—Messrs. T. G. McPharlin (Chairman), S. A. Milne, A. Robertson, J. R. Smart, J. Ross, H. P. Day, J. Murphy, and A. Harper (Hon. Sec.).

DAIRYING.—The Chairman read a paper upon this subject, which was afterwards vigorously discussed. He said in times gone past dairying was so profitable in the district that many farmers had been able to pay for their farms and redeem mortgages at 12½ per cent. by means of this industry; but lately prices of produce had gone down, and it seemed to pay better to grow hay. Still he thought it likely that dairying would soon be resumed. The farm should be divided so as to have summer and winter paddocks, with good water in each, and proper shelter, yards, bails, and dairy buildings and appliances provided. The number of cows kept must be ruled by the feeding capacity and accommodation of the farm; and if the owner cannot purchase the best of pure-bred cows for show purposes, then he must content himself with a good cross of Jersey or Ayrshire or other suitable cross. The lighter cattle are best for the hills. The best time for cows to calve, he thought, was July or August; but where plenty of succulent food is always provided it does not matter when they come in so long as the produce can be sold at a profit. Heifers should not calve till three years old. On a hills farm of 100 acres of fair land—one half grazing, the other half cultivable—it should be easy to maintain twelve cows rear four calves to renew the herd on removal of the old cows, and keep two horses to work the land; as well as to grow an annual crop of cereals, &c.

Renmark, November 22.

Present—Messrs. W. H. Waters (Chairman), Captain Moffatt, W. H. Harrison, R. V. Bostock, E. Taylor (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary reported that ten meetings were held, with an average attendance of seven members. Four practical papers were read and discussed, and many matters of local interest dealt with. Owing to busy season and small attendance no other business was transacted.

Nantawarra, November 26.

Present—Messrs. C. Belling (Chairman), S. Sleep, A. L. Greenshields, E. J. Pridham, T. Dixon (Hon. Sec.), and one visitor.

BUSINESS.—Members reported that they were agreeably surprised at the quality of the wheat reaped this season, the sample being better than was expected owing to severe weather experienced since September. Only business of local importance was transacted.

Forest Range, November 24.

Present—Messrs. J. Vicars (Chairman), G. Monks, C. Stafford, J. G. Rogers, A. Green, and H. Waters.

FRUIT HOUSES.—Mr. Rogers read a paper on this subject to the following effect:—

This subject is occupying the attention of many growers, partly in connection with the codlin moth question. Some advocate storehouses of light material, preferably airtight, so that they can be fumigated two or three times each season to destroy codlin moth caterpillars, &c. Some growers, however, affirm that fumigation is useless, as they believe that when in the cocoon the codlin moth remains proof against fumigation or water. [How many of these growers have actually tried the effect of fumigation on codlin moth cocoons, and are in a position to assert that what has been found fatal to other similar insects is harmless to the codlin moth?—GEN. SEC.]. In regard to the construction of fruit houses he considered the first thing to do was to select a suitable site, fairly level and dry. Do not take too much soil out of the side of a hill to build the house, as this leads to dampness, which, in his opinion, was injurious to storage of garden produce. Each grower must use his own judgment as to materials to use. The house should be from 18ft. to 20ft. wide, and about 40ft. long. He would fix shelves as follows:—Three sets on each side, about 3ft. wide, and dipping about 3in. towards the back, and three shelves down the centre, about 6ft. wide, leaving a passage way of say 3ft. each side. At the door end the centre shelves should be about 12ft. away to leave plenty of room to move about and to pack. In this space the ladder to loft should be fixed. At the opposite end to door a window should be fixed opposite each passage. In fixing up the loft keep the wall about 2ft. below the level of the wall plate, making it roomy and convenient. Have a gable roof and window at each end. Make the shelves of good stiff battens with the sharp edges on top taken off to prevent bruising. Battens should be fixed about 1½in. apart. It is stated that if the air is moist the apples will absorb moisture and not shrivel. If this is correct he thought it would be a good plan to fix cleats under the shelves to carry shallow dishes containing water.

Mr. Vicars said for fruit houses they required airtight sheds, built on a cheap principle; very few of the gardeners could afford to put up a house such as Mr. Rogers recommends. Mr. Green thought sulphur fumes would not kill the chrysalides of the codlin moth, but dipping the cases in hot water would meet the difficulty. Mr. Monks said one large grower was using boxes to store apples, doing away with the shed. Another was making an underground shed, so as to do away with all timber and other material which would afford shelter to the codlin moth. Mr. Rogers said that until it was proved that sulphur fumes would kill the codlin moth it would not pay to go the expense of making sheds airtight.

Onetree Hill, November 25.

Present—Messrs. J. Bowman (Chairman), F. Bowman, J. Hogarth, F. I. Ifould, J. Flower, H. H. Blackham, A. Thomas, and J. Clucas (Hon. Sec.).

MANURING.—Mr. Flower said his experience this year had borne out the opinion he had previously expressed, that heavy manuring in dry seasons was unprofitable.

POTATOES.—Mr. Blackham tabled Beauty of Hebron potato—a good sample, clean and well developed, grown in sand without manure by Mr. J. Purdie.

WEED.—Mr. Ifould reported prevalence in crops of tall weed known as wild cabbage. The weed was, however, not regarded as a serious trouble.

PESTS.—The Chairman said that, having noticed his latest-sown lucern going off, he made a careful examination and found it attacked by a small green caterpillar similar to those which did so much damage to the maize crop last season. Tomato plants have also been destroyed by this pest.

PIGS.—The Chairman read a portion of paper on this subject; to be concluded at next meeting.

Mannum, December 2.

Present—Messrs J. G. Preiss (Chairman), O. A. F. Faehrmann, C. Pfeiffer, E. Hauesler, S. Hauesler, J. A. Schulze Hy. Brown (Hon. Sec.), and one visitor.

DAIRYING.—On November 29 the Dairy Instructor (Mr. G. S. Thomson) delivered an instructive lecture on dairying, which was much appreciated by the residents.

MANURES.—A short discussion took place on this subject. The general opinion was that English super. gave satisfactory returns. Mr. Priess had equally good returns from guano super. as from English super.

HARVESTING.—Mr. Faehrmann's paper on "Best Means of Harvesting" was well discussed. The general opinion was that both stripper and binder were necessary. The difficulty was to treat the sheaved crop satisfactorily, a good thrasher and straw elevator being required, but these machines were too expensive for the average farmer.

Appila-Yarrowie, November 25.

Present—Messrs J. Wilsdon (Chairman), P. Lawson, J. C. W. Keller, A. Fox, N. Hannagan, J. H. Bottrall, W. Stacey, J. O'Connell, J. Daly, W. C. Francis, J. H. Klemm, and C. G. F. Bauer (Hon. Sec.).

FARMERS' RESERVE FUND.—Consideration of this matter was postponed to allow members to look into the matter. [I hope the members of the various Branches will give this question serious consideration.—GEN. SEC.]

EXCHANGE OF SEED WHEAT.—Members reported that they had the following quantities of seed wheat which they would be glad to exchange with members of other Branches:—Purple Straw, 55 bags; Steinwedel, 100 bags; Centennial, 50 bags; Baroota Wonder, 25 bags [Members of other Branches desiring to exchange seed wheat should communicate direct with the Hon. Secretary, stating what they require and what they have to offer in exchange.—GEN. SEC.]

SOURSOPS.—Members reported this weed was not prevalent in the district, being mostly confined to the gardens. A weed known locally as star thistle is spreading, and although the local council do all they can to destroy it, their work is hampered by the inaction of the surrounding councils.

CONGRESS.—The Hon. Secretary gave a report on the proceedings of the Tenth Annual Congress and a report on visit to the Port Adelaide Produce Dépôt. Mr. Stacey reported on visit to Roseworthy Agricultural College.

Stansbury, December 3.

Present—Messrs Alex. Anderson (Chairman), J. Henderson, J. Antonio, P. Anderson, P. Cornish, C. Faulkner, J. Sherriff, George Jones, J. Germain, and H. C. Pitt.

INSECT PEST.—The Chairman tabled branch of teatree badly infested by scale insects. Mr. Jones said he had noticed apparently the same insect attacking the native box.

PARIS GREEN.—Mr. P. Anderson said he had heard that Paris green would cause the death of a person if it got into a cut or sore. Members wished to know whether this was true.

UNDERGROUND GRUBS.—Most of the members had noticed the beetles of the underground grubs, which have done such damage to the crops, in thousands, flying about between sunset and dark—just in the twilight. Very few were

to be seen at other times. There was every promise of a plentiful supply of grubs next year. [And yet although the farmers can easily check this pest by catching and destroying the beetles when they appear above ground and before they lay their eggs, the suggestion that they should make an effort to trap the beetles was ridiculed by many. Every beetle caught and destroyed means probably twenty-five to forty less grubs.—GEN. SEC.]

Dowlingville, November 28.

Present—Messrs. R. A. Montgomery (Chairman), J. Phelps, T. Illman, G. Mason, R. Willing, R. Foggo, F. Roberts, J. L. Broadbent (Hon. Sec.).

BUNT.—Considerable discussion on this subject took place. Mr. Illman said one year he ploughed his seed in; the portion put in dry was smothered with black rust, while that put in after rain was quite free. He thought black rust another form of bunt. [It is not another form of bunt; but is a distinctly different fungus.—GEN. SEC.] Mr. Willing favored washing the seed in three different waters to get rid of the bunt balls, but the Chairman thought this would not do, as the balls were too heavy to rise readily. Other members favored blowing the balls out, which they considered the only satisfactory way to get rid of them. Mr. Foggo had pickled this year with 2lbs. of bluestone to the bag of seed and had no bunt, though last year it was very bad. The seed, however, was injured by the heavy dressing. Some members favored pickling the seed a month before sowing. Pickling on the floor was not approved of, the general opinion being that using a bran bag for the seed and dipping in the pickle was best. Mr. Phelps said the plan he adopted was as follows:—Boil the water, dissolve the powdered bluestone, add more hot water and mix the pickle hot with the seed, covering it over afterwards with bags. He used $\frac{1}{2}$ lb. of bluestone to the bag and had been free from bunt for years.

Millicent, December 3.

Present—Messrs. R. Campbell (Chairman), H. F. Holzgrefe, S. J. Stuckey, H. Oberlander, W. J. Whennin, G. Mutton, B. Varcoc, G. Tantram, and E. J. Harris (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at the residence of Mr. Holzgrefe, the wives of several members being present. After the business of the meeting was finished members inspected the farm. Water was found to be laid all round the premises, an iron turbine windmill raising it to an overhead tank. Friesland, the Holstein bull loaned to the Branch by the Agricultural Department, came in for favorable notice, and Mr. Holzgrefe reported that his services were in good demand. The well-appointed woolshed, pigsties, and other buildings met with approval. The smithy and carpenter's shops were models of neatness and completeness, and all implements and farm vehicles are carefully housed. A paddock of 100 acres of manured wheat was noticed, strips being left unmanured to show the results more plainly. After the inspection members were entertained at tea, and, in replying to a vote of thanks, Mr. Holzgrefe said it had taken a lot of work to bring the farm to its present condition, but it well repaid him for it all. His sons and daughters now took as much interest in keeping things in good order as he did, and it was the means of keeping them together. They keep the implements in order and the stock in good condition, and were thus able to get about their work without any bother. He had taught them to take an interest in agricultural matters, and

to help them he subscribed to the institute, periodicals, &c., so that on Saturday evenings especially they had plenty to read instead of spending their time lounging about town.

EXHIBITS.—The Chairman tabled the following:—Three varieties of clover which were spreading on his land, samples of Algerian oats, black mustard 7ft. to 8ft. high, plant of gorse eaten down by rabbits, and *Poa aquatica* or water meadow grass. In New Zealand some sheepowners had planted gorse as a fodder for sheep, and had largely increased the carrying capacity of their land. The water meadow grass will grow in water 1ft to 2ft. deep and make good fodder. It was growing in the swamps along the Penola Road.

BUSINESS.—Some discussion ensued on water conservation and irrigation, improved methods of branding, dehorning calves, and other matters. Mr. Stewart said he had successfully performed the operation of dehorning by treating the bosses with Greenbank's caustic soda when the calves were two weeks old. Members thought this practice should be more largely adopted, especially where cattle had to be trucked.

Bute, November 24.

Present—Messrs. W. H. Sharman (Chairman), J. H. Barnes, A. Schroeter, H. Schroeter, S. Lamshed, W. S. Sluggett, E. Ebsary, D. Green, W. Hamdorf, M. Hall (Hon. Sec.).

CEREALS.—Mr. Sharman tabled sample of Danish Island oats. The members thought this would be very profitable to grow for grain, but was too coarse in the straw for hay. Mr. Ebsary initiated discussion on wheat-growing in dry seasons. His idea was to fallow and work the land well to prevent a crust forming. Whenever rain fell he would put the harrows on. The general opinion was that this plan would do well in stiff clay land, but the majority were opposed to it for sandy soils. A member stated that he had seen a splendid crop on land treated as described, while alongside on land fallowed at the same time but fed off by sheep the crop went off directly the dry weather set in. Mr. A. Schroeter said some of their sandy land would drift badly if treated in this way. Mr. Sharman agreed that well working the fallows in clay land was profitable.

Petersburg, November 26.

Present—Messrs. W. Miller (Chairman), E. Palmer, W. Heithersay, R. Cochrane, A. Dowd, J. M. Cadzow, H. Earle, D. O'Leary, and J. Wilson (Hon. Sec.).

STANDARD WEIGHT OF WHEAT.—Mr. Cadzow initiated a discussion on the proper way of fixing the standard weight of the bushel of wheat for the season. The farmers should take a more active interest in the matter; it was an imperative duty for them to devise a means of fixing the standard for the colony from a producer's point of view as early as possible, so that the bulk of the wheat could be sold according to the standard fixed. At present the buyers, he believed, really secured the bulk of the crop first. He suggested that each Branch of the Bureau should secure a bushel measure, and when the harvest was half way through each member should bring a $\frac{1}{2}$ bush. of wheat, have it mixed thoroughly together, and send a measured bushel to the Central Bureau. Then the samples from all over the colony could be put together, well mixed, weighed, and measured, and the standard struck accordingly. Mr. Dowd thought this a good idea; he considered the merchants fixed the standard too high. The Chairman considered it necessary to fix as high a standard as

they could reach, as the price of our wheat in London was fixed according to the standard. What the farmers had most to complain of was, not that the standard was too high, but that merchants give them nothing extra for samples that go over the standard. The Hon. Secretary agreed with the Chairman. A high standard would encourage better cleaning; a second run through the winnower would often bring a sample up to the standard that would otherwise have to submit to a reduction in price. In the interests of fair dealing the same amount of increase in price should be given for wheat over the standard as is deducted for that below. The following resolution was carried:—"It is desirable that each member of the different Branches should deliver to the Secretary of their respective Branch a fair sample, say 1lb. weight, of the wheat of his district to be marketed early in season—when reaping is about half completed—the different secretaries to forward the whole to the Secretary of Central Bureau with as little delay as possible; the Central Bureau then to mix the whole, measure and weigh 1bush., the result to be communicated to the Chamber of Commerce so that it might be taken by them into account in fixing the standard weight for the colony." [This matter will be submitted to the Central Bureau, but as the Bureau is not consulted by the Chamber of Commerce when fixing the standard it is difficult to see what good can result. The Chamber adopts practically the same method as is here suggested, and by the Branches forwarding fair average samples of their respective districts to that body, they will assist in arriving at a fair standard for the colony. To handle, mix thoroughly, and weigh 100bush. or more of grain would be quite beyond the scope of the staff of the Bureau, besides which we have absolutely no facilities for carrying out such work.—GEN. SEC.]

Hartley, December 2.

Present—Messrs. C. Harvey (Chairman), T. Jaensch, J. Jaensch, A. Thiele, H. Reimers, J. B. Sanders, W. Klenke, W. Kutzer, and H. Lehmann (Hon. Sec.).

PROTECTION OF HAYSTACKS.—A discussion took place on the best means of protecting haystacks from the weather. Mr. Klenke advised making a floor of straw to prevent any injury to the hay from dampness rising from the ground. For roofing, Mr. Harvey thought a shed with movable galvanized-iron roof, to be lowered or raised by means of chains and pulleys, a good and cheap protection. Mr. Klenke thought thatching with good straw would serve the purpose. The Hon. Secretary said much depended upon the farmers' means, as sheds meant expense. Mr. J. Jaensch considered that a shed closed except at the east end would prove the most economical in the long run for those who had the means to build.

Meadows, December 12.

Present—Messrs. J. Catt (Chairman), T. Brooks, G. Usher, T. A. Buttery, W. Pearson, G. Rice, D. Tester, T. Usher, and W. A. Sunman (Hon. Sec.).

BRANCH SHOW.—It was decided to hold the Annual Show in connection with the Branch on the first Thursday in March, 1899.

CROPS.—Members reported that the hailstorms had had a disastrous effect on crops of cucumbers, melons, tomatoes, beans, &c. The Florida Velvet beans received from the Bureau had been totally destroyed by the hail. It was also reported that the night-feeding caterpillars, which were proving so destructive to the onion crop, had been completely exterminated by a number of growers with the Paris green, bran, and treacle mixture.

Koolunga, November 24.

Present—Messrs. T. B. Butcher (Chairman), J. Button, R. Palmer, J. Sandow, R. Lawry, R. H. Buchanan, W. J. Jose, E. J. Shipway, and G. Pennyfield (Hon. Sec.)

RESTORATION OF EXHAUSTED WHEAT LANDS.—The Chairman reported that Professor Lowrie had delivered an instructive lecture on this subject at Koolunga to a good gathering of farmers. The lecture was greatly appreciated, and a number of questions answered by the Professor.

SEED WHEAT.—It was decided to purchase for the members about fifty bags of seed of different wheats likely to prove suitable for this district.

CASTRATION OF COLTS.—A discussion took place on this subject, and it was agreed that the operation should be performed when the colt was about two years old.

Lipson, November 26.

Present—Messrs. S. F. Potter (Chairman), W. F. Darling, J. Wishart, H. Gale, Chas. Provis, E. J. Barraud (Hon. Sec.), and one visitor.

NIGHT-FEEDING CATERPILLARS.—The General Secretary wrote advising use of Paris green bran and treacle remedy for night-feeding caterpillars attacking potatoes and other vegetables. Mr. Provis asked best means of preventing turnips and carrots from running to seed. Members thought topping the turnips would prevent seeding. [Can any of our members suggest preventive measures?—GEN. SEC.]

Bowhill, November 26.

Present—Messrs. J. G. Whitfield (Chairman), A. Dohnt, J. Whitehead, W. G. F. Plummer, S. Gibson, E. Smith, J. Waters, J. Gregory; H. H. Plummer (Hon. Sec.), and J. Prosser (Forster Branch).

CEREAL EXPERIMENTS.—Mr. Plummer tabled stool of Mennonite oats from Bureau seed. It was sown on June 25 and was, he thought, a good variety for this district. It grows well, has a large stem, and yields well both as hay and for grain. Mr. Dohnt tabled samples of Petatz Surprise and Purple Straw wheats, the first being sown at the end of June, and the latter the end of May. Petatz Surprise, being an earlier variety, produced a good sample of grain, while the Purple Straw had not matured. It was noticeable that the early wheats are generally best this year. Mr. Plummer said his experience was that if you sowed bunted wheat you were bound to have some bunt in the crop, however carefully the seed is pickled. Farmers had frequently themselves to blame for "smutty" crops. Care should be taken to clean out the bunt balls from the reaping machines after going over an infected crop. He suggested that the members should co-operate and purchase about 100 bags of good clean seed, true to name. Mr. Dohnt agreed, but they would have to exercise care and see that they got only clean seed, otherwise they might introduce some undesirable weeds.

FARMING.—Mr. Whitehead read a short paper on this subject. He strongly advocated early sowing, finishing by the middle of May; fallowing and well working stony land; cropping two or three times, and then giving the land at least two years' spell. A few sheep and cattle should be kept, and what horses required bred on the farm. They should be broken in at three years old, but only worked lightly then. Care should be taken in selection of seed, early varieties being far the most profitable. With wheat so low he considered it would pay the farmers to use it for feeding to pigs and poultry instead

of selling it. At 2s., or thereabout, per bushel it does not pay to grow wheat. Mr. Plummer thought it quite safe to sow wheat up to middle of June, but much depended upon the season.

AGRICULTURAL SHOWS.—Mr. Plummer read a paper on "Agricultural Shows," discussion being postponed till next meeting.

Cherry Gardens, December 13.

Present—Messrs. E. Wright (Chairman), T. Jacobs, C. Lewis, J. Lewis, G. Brumby, J. Choate, J. Richards, J. Potter, G. Hicks, R. Gibbins, and C. Ricks (Hon. Sec.)

SEED EXPERIMENTS—Mr. Potter tabled Golden Giant Side Oats; not considered profitable for this district. Mr. C. Lewis showed Chantenay carrots sown on August 9, of very good quality and worthy of further trial. Some months back Mr. Potter tabled plant of English barley, with nine stalks. This was taken and divided into nine plants by Mr. C. Lewis, and planted in ordinary soil, the ground being hoed occasionally to keep down the weeds. From one stalk he obtained ninety good heads of barley; the other stalks also grew and produced well.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year twelve meetings were held, with an average attendance of 105 members and three visitors. Three papers have been read and discussed, a lecture by the Dairy Instructor arranged, and Arbor Day and produce show successfully carried out. Representatives from the Branch attended the Congress in Adelaide, and the Conferences at Strathalbyn and Mylor. Mr. Gibbins was elected Chairman and Mr. Ricks re-elected Hon. Secretary for ensuing year.

SPARROW NUISANCE.—It was decided to call the attention of other Branches, and also of the district councils, to the very beneficial effect resulting from the Branch offering small prizes each month for largest collections of sparrows' heads and eggs. The pest has been very considerably reduced in this district through the action of the Branch.

BRANCH FUNDS.—In reply to inquiry from Naracoorte Branch as to means adopted to raise funds for various expenses incidental to the work of the Branch, this Branch makes it a rule that each member shall contribute a certain amount, and for extra expenses concerts have been held, with good results, no difficulty being experienced in obtaining the help necessary to make these gatherings a success.

Clare, December 9.

Present—Messrs. J. Christison (Chairman), W. Kelly, W. S. Birks, W. Kimber, and J. T. Hague (Hon. Sec.).

GRAFTING.—The Chairman initiated a discussion on this subject. He had grafted an equal number of trees with side and with cleft grafts, and found the latter took better and made more vigorous growth than the former. Mr. Kimber said he had been very successful with bark-grafting, and preferred it to any other method. Mr. Birks had been very successful in vine-grafting, over 90 per cent. having taken. His experience was that the more forward the stock and backward the scion, and the later the grafting was done, the better the results. His method of preserving the scions was to bury them in sand in a cool dry place, and when grafting he rejected any showing signs of growing. The Chairman said he followed the same practice.

Meningie, December 10.

Present—Messrs. M. Linn (Chairman), C. J. Shipway, R. M. Scott, T. W. R. Hiscock, W. Trosser, J. Williams, W. J. Botten, H. B. Hackett (Hon. Sec.), and six visitors.

DAIRYING.—The Hon. Secretary read a paper on “The Best Cow to Breed for Dairying Purposes,” to the following effect:—

Every few years one particular breed of cattle becomes fashionable, and boomed as the best cow for dairy purposes. Even now there is such a great difference of opinion amongst dairymen that it is very difficult to say which breed or cross is most generally favored. The Alderney and Jersey cows were, in his opinion, too small and weedy. There were some people who thought size and shape did not matter as long as the cows were good milkers, but he did not agree with them. Every one dairying should endeavor to breed cows that will not only be good milkers, but be of fair beef shape, so that all culls and surplus cattle can be sold to the butcher at reasonable prices. To obtain such stock small and weedy cows should be crossed with a Shorthorn bull, and large-framed cows with an Ayrshire. The choice of the breed is of less importance than the individual selection of the cows to mate with a bull from a good milking strain. The heifers from these cows should be saved for breeding purposes. He thoroughly agreed with Mr. Putland, of Kadina Branch, that if the heifers from the best cows were reared, and only bulls from good milking strains used, there would soon be a great improvement in the milking qualities of our cows.

Mr. T. Joy (visitor) did not think the saving of heifers from the best cows of much importance. More stress should be laid on obtaining the bull from a good milking strain. Mr. Botten agreed partly with the Hon. Secretary, but favored crossing Shorthorn and other large-framed cows with a Jersey bull. He thought cows showing yellow under the hair generally turned out to be good milkers. Mr. Daly (visitor) found it important to secure the bull from a good milking strain. He had one cow which when mated with a good bull threw a heifer which proved a good milker, but when put to mongrel bulls her progeny were of little use as milkers. Mr. Hancock favored breeding from Shorthorn cows mated with a Shorthorn bull of a good milking strain, or with a good Ayrshire. Mr. Scott believed the yellow color under the hair a good indication of a good milker, and would keep heifer calves showing this color. Mr. Shipway did not consider a cow of beef-making propensities suitable for dairying. Their object should be to get the best milkers. He found that good milkers increased their supply of milk when their feed was increased to a reasonable extent and did not put on flesh, showing that the feed was converted into milk and not meat.

COMPENSATION FOR DISEASED CATTLE.—Mr. Jabez Williams read a paper on “A Plan for an Effectual Means of Stamping Out Tuberculosis in Cattle,” to the following effect:—

This subject is a most important one, and worthy of the earnest consideration of all the Branches of the Bureau, particularly in those districts where tuberculosis is known to exist. Most of the members are of course aware that a number of cattle suffering from the disease have been destroyed in this district of late years, and as breeders it behoved them to do their utmost to stamp out the disease. In the southern districts of the colony this disease seemed most prevalent, while in the north pleuro-pneumonia was to a certain extent prevalent, and it was only by official inspection that the diseases were kept in check. He did not, however, consider the means adopted sufficient to do what was really necessary. They required to reduce them to a minimum if they were not able to stamp them out, not merely to check their spread. He did not intend any reflection on the various stock inspectors; they did their work as well as they could, but were too few in number, and had to overlook too large districts. In any case, under present conditions, it would require an army of inspectors to ferret out all stock showing symptoms of disease, as there are some stockowners who will not report the occurrence of or will even hide the fact that some of their stock are diseased. The destruction of a few head in a large herd is not of much account to the owner, but where there are only a few cattle and the owner is depending upon them for his living, the loss of one or two cows would be a serious matter. Many of these smaller owners are also not thoroughly aware of the danger they run, and, fearing to lose their animals if they report the appearance of disease, say nothing, whereas if there was some means of compensating them for their loss they would readily help in stamping out this

trouble. He believed his plan would meet this difficulty. His idea was that the stockowners of the district should form themselves into an association to raise funds from which payment could be made to owners of cattle that had to be destroyed. Not more than two-thirds of the value of the beast should be paid, and an annual levy of not more than 6d. per head of cattle would meet the demands upon the fund. Once they got a start it is probable that the annual levy would be considerably less. He firmly believed that under a system of compensation the disease would, if not stamped out, be reduced to a minimum in a few years. There were about 3,500 head of cattle in this district, and allowing that thirty head were destroyed the first year the fee suggested would pay compensation at the rate of £2 13s. 4d., two-thirds the present average value. He felt certain that if all would unite in this way the scheme would work well, and even if some of the largest owners refused to join this should not hinder the others from taking the matter up. His chief object in bringing the matter forward was to induce discussion, which might result in a workable scheme being formulated and something practical being done. He therefore moved—"That this Branch take steps to form an association for the eradication of tuberculosis amongst cattle in this district somewhat on lines suggested in this paper."

Considerable discussion followed; and whilst most of the members agreed as to the benefits that result from the payment of compensation for beasts destroyed on account of the disease, some of them were of opinion that as the general community were concerned as well as the stockowners the Government should provide at least some part of the funds required. The Hon. Secretary agreed with Mr. Williams, and said the small owners could carry out the idea even if the larger ones would not join them. In the hundreds of Bonney, Baker, and Mulcolm there were about 700 head of cattle owned by small holders. If an entrance fee of 5s. per member was charged on owners of not more than thirty cattle, 10s. for fifty, and £1 for 100 or over, together with an annual levy of 6d. per head of cattle, they would start with about £35, and this would at £2 per head be sufficient to compensate for the destruction of fifteen cattle, besides necessary expenses. This was allowing for more than likely to be destroyed, and as each year the number would be less, the annual levy would be sufficient. He seconded Mr. Williams's motion. Further discussion was postponed till next meeting.

Port Germein, December 10.

Present—Messrs. G. Stone (Chairman), J. Bews, W. Crittenden, A. Thomson, J. K. Deer, W. Head, W. Mortess, W. Broadbear, A. H. Thomas, and H. J. Gluyas (Hon. Sec.).

THRASHING.—The Chairman reported that the steam-thrashing plant had done a considerable amount of work in the district in a very satisfactory manner, a better yield being obtained than was harvested by the stripper. Mr. Thomas stated that he purchased portion of a crop, had it cut and thrashed, getting 9bush. per acre, while the owner of the land left the rest of the crop and stripped it, cleaning up only 4bush. The field was, as far as could be judged, a very regular crop. Members were of opinion that the steam thrasher would be more largely utilised in the near future in this district. The dairying industry was expanding, and the straw was a necessary and useful food for the cows.

ICE PLANT.—Mr. Crittenden stated that this weed was spreading in the district, and had already taken possession of a considerable area of land, and would, he believed, eventually compel some landowners to throw up their holdings unless active steps were taken to destroy it. All the members agreed that the weed was a great nuisance, and should be placed under the Noxious Weeds Act. The Hon. Secretary stated that he showed some of this weed to the General Secretary, who stated that the weed had been destroyed by an insect in some parts of the Murray district.

MEMBERSHIP.—Mr. J. Bews tendered his resignation as he was leaving the district. Regret was expressed at the loss of Mr. Bews, who has been an active member since the inception of the Branch.

Yorke town, December 10.

Present—Messrs. J. Koth (Chairman), T. Corlett, T. Domaschenz, and J. Davey (Hon. Sec.).

SOURSOFS.—Members reported this weed as existing in a number of gardens, but it had not shown much tendency to spread. On the sand at Sultana it was spreading, however. Mr. Twartz had a quantity in his garden, and the more he worked the ground to destroy it the better it grew. As far as the members knew there was none growing in the paddocks in this locality.

Davenport, December 2.

Present—Messrs. W. J. Trembath (Chairman), F. B. Rathbone, J. E. Lecky, W. Penna, W. G. Pryor, T. McDowell, R. Fawcett, and J. Roberts (Hon. Sec.).

INSECT PESTS.—The Chairman reported that following the complaints made at last meeting of the presence of grubs and beetles, which had attacked almost every conceivable kind of vegetable growth, samples had been sent to the Central Bureau for identification, and for advice as to best means of destroying them. In reply the General Secretary said that the grub or caterpillar was a species of cut-worm (*Agrotis suffusa*) and could be destroyed by means of poisoned baits, made by mixing 8ozs. Paris green, 4lbs. molasses or honey, and 30lbs. bran, with sufficient water to make a thick paste, and placed at close intervals between the rows of plants. Another remedy—Mix 1oz. Paris green with 3lbs. lime or gypsum, and dust over the plants attacked. The beetles (*Isodon laticollis*) worked their mischief underground, and their destruction was therefore a matter of great difficulty. If they fed above ground, dusting with Paris green and lime should prove effective.

EARLY GRAPES.—Mr. Pryor tabled a bunch of small black grapes which were new to him. He could not say whether it was a seedling. This was the first year the vine had borne, and the grapes ripened on November 23. Mr. Hodshon said in form and taste it resembled the Black Hamburg. Mr. Rathbone said it would be well to send the grapes on to Professor Perkins for identification. November was phenomenally early for ripening.

PAPER.—Mr. F. B. Rathbone then read a paper on "Wasted Time, Lost Opportunities."

The above title sounds more like the heading of a moral lecture than an address on agricultural matters, but I trust as I proceed that it will be seen that I have abundant justification for the remarks which follow. This Branch of the Agricultural Bureau has been in existence for over five years and has held regular meetings, which have been fairly well attended, and at which all sorts of subjects have been discussed. Now, can any one member definitely state what actual benefit he has received from his connection with it; or has any member kept any accurate account of the actual cost of production of any one article which he has grown or produced, and if so what profit has he made, or what has been the amount of his loss? In my opinion the great cause of non-success of farming—and in saying farming I include everything that pertains to cultivation of the soil, whether for grain, fruit, vegetables, or live stock—is the absence of accurate book-keeping, and although the bulk of my paper is applicable specially to the district in which this Branch has an immediate interest, this applies to farming all the world over. Many a farmer who comes out on the wrong side at the end of the year is at a loss to say definitely how it has occurred. He attributes it to bad seasons, low prices for produce, and various other causes, which, although doubtless true in the main, are not altogether responsible for his non-success. Had he kept an accurate account of the cost of production of each item he would perhaps have found that those items which were as he thought paying him well were the very ones over which he lost money. Many a man does a little breeding of horses, and if he sells a young one for £5 or £6 in nine cases out of ten he reckons this as profit; he forgets the feed the mare and foal have eaten, and the inconvenience he has been put to through not being able to work the mare when he perhaps urgently needed her, also the sundry bits of hay in bad times. Poultry and pigs he often roundly declares do not pay, and he is ever ready to tell you the quantity of grain the former eat, forgetting the

number of eggs the family and himself have consumed and the occasional fowl they have had for dinner. In this district especially I consider that where we have to pay for water it is impossible to find out how we are going unless we can accurately state the quantity of water consumed, labor expended, and amount received for each individual item of production. If we are gardening simply for pleasure or as a hobby of course this is beside the mark. I know in England my father used to grow hot-house grapes, and very nice they were, but in the light of later experience I am sure the grapes must have cost him at least 3d. a berry, and so I believe it is in many cases here. We grow lucern, fruit, and vegetables at an actual cost in excess of their monetary value. As business men this is folly, and the sooner we wake up to the fact in this climate—with its hot winds, sudden changes, and dust storms, in fact everything against us—that gardening for profit with water at 6d. per 1,000 galls., or even 1½d., will not pay the better for us. If any one member can say that after putting down all his items of expenditure, and making a fair allowance for the time he has employed, and interest on money invested, and losses of trees, stock, &c., that his block has yielded him a profit, I trust he will tell us how he has managed it. I think the bulk of my hearers will agree with me that their time has been wasted, that is to say from a scordid view of £ s. d. Of course the pleasure they have derived is another matter, and may compensate them for their monetary loss.

Now, during all this time we have been endeavoring to grow fruit and vegetables at a price to compete with the Adelaide hills and other more favored portions of the colony—we have totally neglected an industry that would have paid us all along, bad as the times have been. I refer to poultry-raising, and I can say unhesitatingly that if we in this district cannot raise poultry at a profit we shall never be able to compete in other lines. I am open to buy poultry myself, but no one has a bird of any description for sale. At Christmas time I rode over sixty miles trying to purchase a fat turkey or goose, and was unable to do so. Many say the price of grain precludes them feeding poultry; but if we are going to have wheat cheaper than it has been for the past three years, it is a bad outlook for our farmers. The fact of the matter is that when we have a few fowls and buy a bushel of wheat we do not notice the outlay, but when we increase our stock tenfold we begrudge increasing our outlay for purchased food fivefold. The consequence is, the stock not getting enough to eat, do badly, and we at once declare poultry does not pay. As I have before said, it is a matter of bookkeeping, and unless we keep an accurate account of income and expenditure we cannot definitely say whether it pays or not. My experience has been that if you can get wheat at 5s., bran or pollard at 1s., and can get 1s. 6d. for fowls, 9d. per dozen for eggs, 4s. for geese, and 5s. for turkeys, there is a good margin of profit. There must, however, be a systematic plan of working, and my procedure would be as follows (mind there must be capital to start with, not necessarily a large sum, but £3 or £4 is required): Erect a small shed, using as little wood as possible, and limewash inside and out, have the perch insulated by means of the neck of a bottle filled with water or a little kerosene; make the nests of four bricks and a little sand on the bottom. These precautions are against lice; if you have a run for your fowls well and good, if not you must make a yard of wire-netting (2½in. mesh will do). If possible keep two breeds, one for setting and the others non-sitters, and of course in this respect every one must follow his individual judgment. Breed early chicks that will start laying the following spring, cull out the young roosters and if possible caponize; in any case sell them as soon as possible. Never keep a hen beyond her second moult; if she is not in marketable condition coop her up and cram her for a week or ten days, and off with her head. Feed regularly as follows: Have a kerosene tin and put in all the house scraps, potato parings, and any odd vegetable leaves and bones; put this on the fire at night and let simmer as long as the fire lasts. In the morning pour off any surplus liquor to boil up with that day's scraps, and mix the solid with some pollard to form a stiff dough that will break on throwing down; in the evening scatter a few handfuls of grain to the stock. Always have fresh water in clean vessels kept shaded, give birds plenty of grit and fresh-ground bones. By observing these details success will be as nearly certain as it is possible to command. The failures of poultry-keeping are, in my opinion, caused by the following: 1. The necessary food is begrudged them, as most people seem to think eggs should be produced at about 2d. per dozen, and fowls should get their own living. 2. Not enough attention is paid to detail, such as early and regular feeding, cleanliness, and pure water. 3. Absence of culling and killing off old stock, mostly on account of a mis-conceived notion that they are good because they have been so in their youth. 4. Too much is left to the wife, who, in ninety-nine cases in 100, has her hands overflowing with work already, especially in the morning, when fowls want most attention. As regards markets for fowls and eggs, I consider there is splendid scope. Of course Broken Hill can absorb a lot, but we have a better one at our own doors; had we a regular supply the steamers, hotels, and private houses would take—in the aggregate—an enormous quantity; but at present there is no supply.

Another neglected opportunity is pigs. You cannot procure any; certainly the butchers raise a goodly number, but I am sure I am only voicing the sentiments of most when I say that 1d. per pound more would be paid for private-fed pork than butcher-fed. The same remarks

re erroneous impressions as to cost of feed applies to these as to fowls. We begrudge increased outlay with increased stock. There is enough food thrown away in this town to keep scores. It would well pay anyone to supply householders with a suitable tin to put their daily scraps and slops in and collect same every day. We can combine all these things with irrigation to a limited extent, but I reiterate that fruit-growing alone will not pay here, owing to climatic conditions, and to continue on the lines we have been pursuing is only courting financial failure, and I firmly believe if any blocker will give poultry-farming a fair trial they will succeed; anyhow, I am open to buy poultry at present. Can you supply me, if not, why not?

Riverton, December 17.

Present—Messrs. H. A. Davis (Chairman), J. Kelly, W. Hannaford, D. Kirk, T. Gravestocks, Dr. Allwork, and H. A. Hussey (Hon. Sec.)

REARING CALVES.—At previous meeting Mr. A. B. Welch read a paper on this subject to the following effect:—

The rearing and feeding of calves is a simple undertaking, requiring from those who have charge of them the display of patience rather than that of intelligence; in fact, I look upon the whole of the operations as so very easily performed as to almost think it time wasted to ask your attention while I explain my methods. I have brought the subject before you more in the hope of provoking a good discussion as to whether it is not advisable to save and rear all your calves, instead of doing as many now do, cut the throats of 80 per cent. of the little brutes at birth. I do not like this butchering of young calves, it is a mischievous practice, introduced by town dairymen and others, who sell or in other ways dispose of the whole of their cows' milk, and even in this case, I think spaying might be tried as of two evils the lesser; but every man who calls himself a dairy farmer ought to banish it at once as a practice as barbarous and short sighted, and the falsest economy. Now, we do not want any sentiment introduced into the matter, and I am only moved by an earnest desire to do that which is true economy, to act only in the interests of your pockets, and at the same time conform to the laws of nature.

Now, bearing in mind that the last two seasons were seasons of almost famine, my observations have led me to the conclusion that you can profitably rear all your calves. I may tell you that in the whole of my dairy farming career—about five and twenty years—raising the calves was a leading line. I know some of you say they do not pay so well as hog-raising. Most of you who say that have never tried it; feed the calves as well as you do the pigs, and mark the results. However, you can do both. In early spring milk is at its lowest value for butter purposes, just the time when young calves require it, and pigs do not. As the summer advances you wean the calves off, and feed well your store pigs to get them into condition for early winter slaughter—just the right time for bacon-curing, and when your pork will be most appreciated. Cattle maintain a good average price; do not be frightened by the hordes coming in from Queensland or anywhere else. If you are dairying, raise your calves; they do not eat much after weaning, and if well looked after it is surprising how often they will fetch in a nice cheque. It is no good saying it does not pay, for if dairying pays you at all this branch will pay. With good steady milking cows my practice was to let the cow have her calf for one or two days, for these reasons: The calf bumping and drawing at the udder will soften the bag and free the teats better than by hand. The cow will stand this from her calf, but from no hand-milker; she will quieten down and regain her normal condition at this critical time quicker if the calf is allowed access to her; the calf too will gain immensely by this treatment; this you can modify in practice more or less, according to the beast you have to deal with. You must have a shed and separate enclosure for the calves, and the first week or ten days give them two or three pints of new milk with a little sweet skim milk every morning; at night three or four pints of sweet skim milk only. At two or three weeks of age they ought to have at least one and a half gallons of milk (skim) per day, with the addition of a little good pollard. At four weeks they will begin to eat; you can then give them some hay to pick at. If early in the spring, be sure and house them in a clean dry shed, and keep warm; do not let them run out on cold wet days, otherwise they can be out every day after they are a week old. At six weeks is the best time to castrate; this I always safely perform by tying the severed cord with twine, leaving ends of twine hanging clear from wound in purse. If your calves should happen to scour very much be liberal with good new milk. I fancy there is something too in the way the calves are fed or take their food. Some calf-raisers are never satisfied until the young creature drinks. My practice, and I believe it is by far the best, is to feed the calf by suction, that is using the fingers to act as a teat. You might at first wet the calf's mouth with milk, say with a cup, pouring a little milk therein; then slip two fingers into its mouth, and slightly open the fingers, gently pressing the calf's head in milk pail. If it does not suck, open your fingers till one just touches the roof of mouth, the other

pressing lightly on tongue; this will induce movement of tongue, and after the first taste there is seldom much more trouble. It is much more troublesome to get them to drink, and it is not natural that they should drink at first, by and bye they will drink all right as they get stronger and more hungry and vigorous. If they are taught to drink too early they take their milk much too fast, which is not good for them, being very apt to cause bloating and other derangements. I know the tendency of most calf feeders is to hurry and get it done, but this is a mistake. What is worth doing is worth doing properly. Always bear in mind that the calf is going to make the cow. Acts stamp character, and the kicking vicious cow is generally the result of illfed, illused, dog-roused-about young cattle, thus early taught to retaliate. If at any time you are short of milk, a fair substitute is hay tea, made from fresh cut hay chaff scalded, mixed with whey and pollard. Calves treated on above lines, which can only be called fair treatment, for it is by no means extravagant, will make good, sound-conditioned cows, with some constitution about them. Fifty per cent. of the diseases and weaknesses which are thinning out our dairy herds may, I have not the slightest doubt, be traced to weedy, puny, pot-bellied, sloppy-fed calves. I do not remember losing one cow raised from my hand-fed calves of the disease which is perplexing dairymen of all the colonies. I allude to what is known here as impaction of the stomach, cripples, &c. Carry your minds back a few years. Who ever heard of this complaint devastating the cattle on the runs, as it is now doing on nearly every farm in the three southern colonies. I have been amongst farmers in many different parts, and have always found it—through the rich northern country of Tasmania, all over Victoria, here in Riverton, down at Port Victor, on the West, and away up through Crystal Brook and the North. The reason for this disease to me is not far to seek. Wherever I have been in this and the other colonies the young cattle are generally shamefully neglected and starved by dairy farmers. I have seen them most grossly illused and fed worse than pigs, and then when they were sold at two years old and fetched only a low figure, surprise was expressed, and "really, you know, calf-rearing don't pay." I have often noted in the same district, under same natural conditions, calves at eighteen months bigger and heavier than scores of cattle at two and a half years, and I have been astonished till I found out the cause, *i.e.*, proper feeding. As you are now thinking of introducing special breeds here in your cattle, I do hope the calves will get more attention, and that farmers generally will centre more interest in the cows, and take pride in producing strong big-bodied cattle.

DISEASES OF STOCK.—The Hon. Secretary read paper from January *Journal*, prepared by Stock Inspector Needham, on Some Diseases of Stock and their Treatment.

Mount Compass, December 10.

Present—Messrs. M. Jacobs (Chairman), S. Athurs, T. Chaplin, R. Cameron, C. S. Hancock, A. J. Hancock, E. Good, S. Laurance, D. Wright, H. McKinlay (Hon. Sec.), and three visitors.

BREAKWINDS.—Mr. Laurance read a paper on Breakwinds for Orchards. Suitable trees should be planted round the garden, such as pines, bamboos, alders, &c. The latter is specially suitable for swampy soil, and grows to a considerable height, making good durable timber. The bark of the young wood was a powerful astringent, and was largely used for tanning. The roots were sometimes split and used for basket manufacture, while the young shoots were much liked by cattle. Members agreed as to necessity for breakwinds, and would like information concerning the alder.

Mount Gambier, December 10.

Present—Messrs. J. Umpherston (Chairman), W. Barrows, D. Norman, sen., J. C. Ruwoldt, A. J. Wedd, G. G. Collins, M. C. Wilson, T. H. Williams, J. Watson, and E. Lewis (Hon. Sec.).

SOUTH-EAST CONFERENCE.—Naracoorte Branch wrote that the annual conference of South-Eastern Branches would be held at Naracoorte about March 15. Members considered this too early, and suggested the middle of April as a suitable date.

DAIRYING.—Considerable discussion took place on the most suitable breed of dairy cows to cross with the present breeds. Some members advocated the Holstein, others the Shorthorn, and others the Ayrshire. It was finally decided to ask the Department of Agriculture for the loan of a Holstein bull, or failing that, a good dairy strain of Shorthorn. Mr. Watson called attention to cure for milk fever mentioned by Mr. Alex. Murray, of Mount Crawford (published in this issue of journal). Mr. Ruwoldt said lowering the condition of the cows at calving time acted as a preventive.

Tatiara, November 26.

Present—Messrs. T. Stanton (Chairman), E. Prescott, R. Scown, D. Makin, J. Rankine, and W. E. Fisher (Hon. Sec.).

MANGOLDS.—A discussion ensued on the cultivation of mangolds. The Hon. Secretary said he had prepared and planted a piece of land with Globe and Long Red mangolds, as directed in paper read by Mr. W. Pearson of Meadows Branch. The plants were looking splendid. Mr. Prescott found it best to sow seeds in beds in February and transplant. By adopting this practice they could depend upon having a supply of good mangolds in September. Mr. Rankine said his plants all went to seed; he supposed they were sown either too early or too late. He considered good solid fair-sized roots better than very large ones, with which members agreed.

MANURING.—A discussion took place on the results of the application of fertilisers. Mr. Rankine said he had noticed that the flag of the wheat crop all died away. A few weeks previously there was a mass of beautiful foliage, but this had all disappeared, and he was of opinion that it was a distinct loss. Members agreed, but could not come to any definite opinion as to the cause. They wished to know whether any reason could be given for this. Mr. Rankine said he had a splendid crop of Cape oats on land manured with super.

Kanmantoo, December 2.

Present—Messrs. Thomas Hair (Chairman), John Downing, W. G. Mills, J. T. Hair, Thomas Hawthorne, John Mullins, P. Lewis, F. Lehmann, and A. D. Hair (Hon. Sec.).

PAPER.—The Chairman read a paper on his trip through the crops as far as Snowtown, and a short discussion followed.

KING'S EARLY WHEAT.—A member stated that Professor Lowrie had advised farmers to grow this wheat, but it was not stated whether it held the grain well, or shed out, as many of the early wheats do in windy weather. Members desired information on this point. [Professor Lowrie says King's Early wheat holds the grain splendidly. The results of the College experiments, published in this issue of the *Journal of Agriculture*, show that, although ripening earlier, and consequently being more likely to be affected by the exceedingly windy weather experienced this harvest, it yielded 7bush. to 8bush. per acre more than Early Para and Smart's, which promised equally well before they ripened.—GEN. SEC.]

RABBIT POISONING.—Mr. Mills reported having successfully poisoned rabbits, when there was plenty of green grass, with the following mixture:—1bush. pollard, 2 sticks phosphorus, 4lbs. treacle, and 30 to 40 drops aniseed oil. The latter gives the baits a very strong smell, which is apparently enticing to the rabbits, and was in his opinion a great improvement. This mixture had had equally good effects since the grass had become dry. Mr. Mullins had used bi-sulphide of carbon during the winter in the burrows, using the waste wool from dead sheep with very satisfactory results.

Stockport, December 17.

Present—Messrs. T. Megaw (Chairman), C. W. Smith, C. F. Jorgensen, F. Watts, M. Connolly, G. Burdon, D. G. Stribling, S. Rodgers, J. Murray (Hon. Sec.), and six visitors.

BUNT.—The Chairman tabled ears of wheat, one side containing good grain and the other being bunted. Members wished to know reason for this.

DAIRYING.—Mr. Jorgensen initiated a discussion on the best cattle for dairy purposes and for beef. For the farmers he considered the Jersey-Southern cross best. He would breed from the Jersey cow, because the calf would benefit from the richer milk given by the Jersey. Considerable discussion ensued, various breeds being favored. The question was raised as to results from crossing two pure-bred animals. Would the progeny as a general rule share the characteristics of both parents, or would the influence of one, and if so which, predominate? [This will depend upon the breeds, and also upon the individual parents. Bulls of some breeds have a very marked influence on their progeny, but it is difficult to say what the general result is.—GEN. SEC.]

Finniss, December 17.

Present—Messrs. T. Collett (Chairman), T. R. Sumner, A. Willcock, W. W. Heath, and S. Collett (Hon. Sec.).

SELECTION OF SEED WHEAT.—The Chairman tabled sample of wheat grown from a grain picked from a sample of Dart's Imperial wheat. This proved to be very early and prolific.

HOMESTEAD.—This meeting was held at the residence of the Chairman. Members inspected the garden, and found the fruit trees growing well, but bearing little fruit. There was, however, an abundant crop of grapes.

RAINFALL.—Recorded for 1896, 17.05in.; 1897, 14.56in.; for 1898 to date, 14.97in.

Lyrup, December 6.

Present—Messrs. A. Thornett (Chairman), T. Nolan, P. Brown, F. E. Chick, O. Klemm, D. J. Bennett, A. Weaver, D. Thayne, T. R. Brown, W. H. Wilson (Hon. Sec.), and six visitors.

POTATOES.—Mr. Chick tabled good samples of Beauty of Hebron and Flourball potatoes grown under irrigation at the Lyrup public school.

CUCUMBER BEETLES.—Members reported that where lime and sulphur had been dusted on and under the leaves of melons and cucumbers attacked by "bugs" it had had a very beneficial effect.

WHEAT-GROWING.—A discussion on harrowing the growing crop was initiated by Mr. Menzies, a visitor, who was strongly opposed to the practice. Mr. Thayne was of opinion that harrowing would be beneficial if rain fell soon afterwards. The question of binder *v.* stripper was also discussed, and it was decided to consider the matter at next meeting, when paper by Mr. J. King, read at Congress, will be discussed.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Accident Insurance of Seamen in France.

The *Labor Gazette* (Board of Trade Labor Department, England) for October gives the following information regarding accident insurance of seamen in France:—

Under a law dated April 21, 1898, and coming into operation on January 1, 1899, French seamen are required to be insured against accidents and illness incidental to their occupation. For this purpose a National Fund is to be established in connection with the Seamen's Superannuation Fund, which has existed since 1681. The resources of this new fund will consist of the contributions of employers and employed, and also gifts and legacies, and grants which may be made by the departments or communes, by public institutions, and by associations, and in case of necessity, of advances, free of interest, by the State.

The contributions of seamen are to be made by compulsory deductions from their wages, 1½ per cent. on wages for crews paid by the month or voyage, and those engaged in deep-sea fishing; for other seamen, specified sums, *e.g.*, for an ordinary sailor on a coasting vessel, paid on the share system, about 6d. per month.

Shipowners and charterers have to contribute at the same rate (generally) as their crews. The contributions of both employers and employed may be increased or reduced if the position of the fund requires or enables this to be done.

The benefits conferred are as follows:—For permanent total disablement, a life pension; for temporary incapacity, a temporary allowance on the same scale. A life pension is also provided for the widow of a seaman whose death was due to accident or disease incidental to his occupation. A seaman or a seaman's widow further receives an extra allowance for each child under 10 years (unless a similar allowance is payable from the Superannuation Fund). Children of a seamen, if neither father nor mother survive, receive, until the youngest is 16, a joint allowance equivalent to the pension which their mother would have received if alive. Parents or grandparents receive a pension if the seamen leaves neither widow nor children.

The annual amount of the pension due to an ordinary seaman, if suffering permanent disablement, is £8 3s. 2d.; his widow will get £7 13s. 7d.; if he left no widow or child, his parents or grandparents would receive a joint yearly allowance of £3 16s. 10d. These amounts are reducible by one-half in the case of persons receiving allowances from the superannuation fund or the State. The extra allowance for each child under 10 would be 19s. 2d.

The remedy given by the ordinary law in respect of deliberate wrongful acts or gross negligence is not taken away; damages recovered in respect of such acts or negligence will be deducted from the allowances provided under the new law.

Harvesting Machinery.

BY INSPECTOR BANNIGAN.

A few particulars respecting the progress made in the improvement of harvesting machinery during the past sixty years may not be altogether uninteresting at this time of the year, when our farming community are busily engaged gathering in the remnant of what, earlier in the year, gave great promise of being a bountiful harvest.

Although closely connected with agricultural pursuits from his early youth, the writer does not pretend to give his own experiences in reviewing the advances made in the improvement of harvesting machinery since the first memorable reaping machine was invented and given to the colony by the late intrepid Mr. Ridley. He is indebted to Mr. J. A. Bagshaw, the genial mayor of Brighton, and senior partner in the old-established firm of J. S. Bagshaw and Sons, machinists, of Elizabeth Street, Adelaide, for most of the old-time memories which follow.

It will be within the recollection of many South Australians that in the early days when one wished to view the wheat fields it would be necessary to make a journey of nearly a mile to where Thebarton and other urban towns now stand, and here might be seen dozens of stalwart reapers with sickle in hand merrily cutting the golden corn, which in turn was collected and bound into sheaves and stooks by the not less merry buxom women and girls.

About this time the late Mr. Ridley, who owned and worked a flourmill at Hindmarsh, conceived the idea of stripping the heads of wheat off the straw by means of machinery, and, assisted by the late Mr. J. S. Bagshaw, the famous Ridley machine was in time produced.

I am informed that the comb of this pioneer of a long line of useful machines that followed was constructed of rifle bayonets, having their butt ends embedded in lead.

The driving gear consisted of a crown with the cogs on the outside, causing the flywheel to revolve backwards, and this necessitated a twist in the belt to induce the beaters to revolve in the right direction.

To be in keeping with the backward motion of the gearing, the team was yoked to the rear of the machine and pushed it in front, somewhat after the manner in which a lawn mower is pushed by a gardener at the present day. To make this possible a long pole was attached to the rear of the machine and on the end of this the driver was perched, and from this awkward position he had to drive the team and steer the machine. A pair of steering wheels were attached to the machine, and were manipulated from the end of the pole by means of chains or rods, on the principle employed in managing the rudder of a ship; but as the driver was necessarily behind his team and the team was behind the machine, he had very little chance of keeping his comb full, and still less of avoiding the stumps.

The advantage of the new invention, with further improvement, was so evident, that rapid strides were made in perfecting it, and in a few years Gawler became the great manufacturing centre from which hundreds of reapers were annually turned out, at a cost of from £70 to £120 each.

In the meantime the process of separating the wheat from the chaff was both slow and laborious.

The most common plan was to take advantage of any chance breeze, when a man standing on a box with a dishful of the wheat and chaff would by tilting it to one side slowly shake out the contents, allowing the wind to carry off the chaff, leaving the grain comparatively clean.

The more well-to-do used a large box or frame called a "Lucy," which was covered on the under side with inch mesh wire netting, and this suspended by ropes from three poles, tripod fashion, and shook smartly, would put an enormous quantity of wheat through in a day, provided always that the wind was favorable. Then followed the first winnower, constructed, I understand, by Mr. Bagshaw, bullock bows and such like handy material taking a very important part in its manufacture. The screen of this early effort was made of strips of wood and odds and ends of copper wire served for the sieves. Great improvements have been made in both classes of machines since they were first introduced as above described, and to-day they are as near perfection as it appears possible to get them.

One firm alone in South Australia have turned out for 1898 no less than 340 winnowers, and of this number 194 have been sent out of the colony, showing clearly that in this line, at any rate, we can hold our own with our neighbors.

School of Mines and Industries.

The above institution, which has made wonderful progress since it was established in 1889, held its annual demonstration on Friday evening, December 16. Sir J. L. Bonython, the president, occupied the chair.

During the past year 1,041 students had attended the classes; 125 students had been instructed in assaying and metallurgy. The classes for chemistry were attended by 286 students. In mathematics 131 students were instructed. Applied mechanics, engineering, and machine design had 37 students; mining, mineralogy, and geology, 63 students; studying physics, 145; drawing and surveying engaged the attention of 174 students.

Of the ages of the students it was announced by the chairman that 817 students were over 16 years of age, and that 300 were above the age of 21.

The Adelaide University and the School of Mines are working in harmony.

The Right Hon. C. C. Kingston, Premier and Minister of Industry, presented the diplomas to the successful students.

The following list gives the names of students who have passed the examinations for 1898. The names are in order of merit :—

PRELIMINARY ASSAYING.

First Class.—Frederick William Reid, Percival George Wykeham Bayly.

Second Class.—John Cleve Collison, William Gwennap Anthony, Nigel Stuart Giles, Sydney Harcourt Pascoe.

Third Class.—Frederick Williamson Finlayson, George Percy Woodville Rofe, Alfred Henry Piper Lowry, Howard Clive Edwards, William George Sutherland, Thomas Augustus Keats, Walter Tidd Rowe, James Gairdner Blackmore.

ADVANCED ASSAYING.

First Class.—Philip James Arthur Plummer, Douglas Charles Winterbottom, Lawrence Harcourt Landseer, Henry Leo Kennedy; Norman Crichton Bell, Willoughby George Bell, equal; John Cleve Collison, Howard Clive Edwards, Edwin Thomas Henderson, equal; Norman Victor Grierson, Clement Alfred Hack, equal; Garbut Thomas Wooldridge, George Lytton Wright, equal; James Ayrton Close, John Leahy, Sydney Harcourt Pascoe, Allan Douglas Robinson, William George Sutherland, equal.

Second Class.—Percy Woods Moncrieff, Samuel Gallie Phillips, Harrie Walter Solomon, Herbert Theodore Wadey.

PRELIMINARY METALLURGY AND ASSAYING.

First Class.—Nigel Stuart Giles, Henry Auburn Pilgrim, George Percy Woodville Rofe, Percival George Wykeham Bayly, Allan Douglas Robinson.

Second Class.—Walter Tidd Rowe, James Gairdner Blackmore.

Third Class.—Richard Holtaway Giles, Samuel Gallie Phillips.

ADVANCED METALLURGY AND ASSAYING.

First Class.—Edwin Thomas Henderson, James Ayrton Close.

Second Class.—Percy Wood Moncrieff, Howard Clive Edwards, Clement Alfred Hack, Philip James Arthur Plummer; Willoughby George Bell, Norman Victor Grierson, equal; Norman Crichton Bell, Douglas Charles Winterbottom.

Third Class.—Richard Holtaway Giles, John Cleve Collison, Samuel Gallie Phillips.

APPLIED MECHANICS.

Second Class.—Arthur John Spiller Wright.

CHEMISTRY.

First Year.

First Class.—Sydney Harcourt Pascoe, Thomas Augustus Keats, Thomas Charles Greenway, Edward Hosking.

Second Class.—Harry Martin, George Cobbett Botten, Donald James McLaren, William Gwennap Anthony, Maxwell Armstrong Fotheringham, Percival Henry Edward Runge.

Third Class.—Norman Hallett Wood, William George Sutherland, Ernest John Nevill Fisher, Emil Henry Sydney Buttfild, Henry Henderson Jones, Richard Holtaway Giles; William Percival Henwood, Reginald Bickford, Fred Clarence Stockwell, Frederick Beeby Lane, equal.

Second Year.

First Class.—Frederick William Reid, Herbert Theodore Wadey, Douglas Charles Winterbottom, James Gairdner Blackmore, Percival George Wykeham Bayly, Henry Auburn Pilgrim.

Second Class.—Garbut Thomas Wooldridge, George Percy Woodville Rofe, Alfred Henry Piper Lowry, Richard Holtaway Giles, Nigel Stuart Giles.

Third Class.—Lawrence Harcourt Landseer, John Leahy, equal; Howard Clive Edwards, Samuel Gallie Phillips, equal; Harrie Walter Solomon.

Passed in Practical Chemistry.—Harry Bray.

PREPARATORY CHEMISTRY

First Class.—Arthur Eustace Harrington, Irvine James Ward, William Robert Earle Henderson.

Second Class.—John Alexander Joseph Primrose, Victor Napoleon Mark Cohen, Maurice Edward Maughan, Ralph Edmund Humphries, Robert Glanfield Hawkes, Hilda Napier Crooks, Francis Joseph Gatzemeyer, equal; Max George Staer.

Third Class.—Josiah Percival Willmott, Harold Hodgson, equal; Sidney Victor Eaton, Methuselah Prisk Tregonning, Josiah Willmott, Edward Frederic Smith.

DRAWING.

Freehand—First Grade.

First Class.—Ernest John Neville Fisher.

Second Class.—John Andrew Jelly, Louis Laybourne Smith, equal.

Third Class.—Percival Henry Edward Runge, Edward Hosking, Robert Martin Angell, equal; Algernon Sheppard Lindsay, Philip Motteram, Donald James McLaren, Sydney Wentworth Nicholls, Harry Bray, equal; Thomas Foggo Whillas, William Percival Henwood, Arthur Wellesley Hill Winterbottom, equal; Percival George Wykeham Bayly, Edward Thomas Columbus Fitzgerald.

Geometry—First Grade.

Second Class.—Christopher George Seymour Bagot; Sydney Wentworth Nicholls, Thomas Charles Greenway, equal; Thomas Augustus Keats, Fred Clarence Stockwell, William James Cowell, equal; William Percival Henwood, Edward Thomas Columbus Fitzgerald, equal; Donald James McLaren.

Third Class.—Hugh Formby, Harry Bray; Harry Martin, Thomas Foggo Whillas, Kenneth Campbell Church, equal; Gerald Stedman Tolmer, Herbert Shaw Waterhouse; Charles Thomas Maxfield, Harold Wilfrid Hague, equal; William Alfred Hunwick.

Geometry—Intermediate.

First Class.—Donald James McLaren, Hugh Formby, Sydney Wentworth Nicholls, equal; Fred Clarence Stockwell, Louis Laybourne Smith.

Second Class.—Harry Martin, Arthur Wellesley Hill Winterbottom, equal; Hugo Harold Wertheimer, Thomas Foggo Whillas, Percival Henry Edward Runge, William James Cowell, Edward Thomas Columbus Fitzgerald, equal; Vincent Nestor Jones, Henry Henderson Jones; Kenneth Campbell Church, Gerald Stedman Tolmer, equal.

Third Class.—William Percival Henwood, Harry Bray, Harold Wilfrid Hague, equal; Algernon Sheppard Lindsay; Thomas Augustus Keats, Alfred Henry Piper Lowry, equal; Dudley George Steele, Christopher George Seymour Bagot, Thomas Charles Greenway.

ELECTRIC ENGINEERING.

First Year.

First Class.—Edward Bromley.

Second Class.—John Smithson Elliott, Karl Otto Swan.

Third Class.—John Stephens Just, Algernon Sheppard Lindsay, Charles Lancelot Moule, Harold Eaton Taplin.

Second Year.

Second Class.—Ernest Montgomerie Martin, William Russell Luke Dehenhardt.

Third Class.—Adolph Clifton Stock, Herbert Clegg.

ENGINEERING.

Third Year.

Second Class. — Arthur John Spiller Wright.

Fourth Year.

First Class. — Harry Wheeler Brown.

GEOLOGY.

First Class. — Frederick William Reid, Nigel Stuart Giles, Henry Auburn Pilgrim, Percival George Wykeham Bayly.

Second Class. — James Gairdner Blackmore, John Cleeve Collison.

Third Class. — John Leahy, Robert Crompton, George Percy Woodville Rofe, William Gwennap Anthony.

MINING.

First Class. — Percy Woods Moncrieff.

Second Class. — Allan Douglas Robinson; Philip James Arthur Plummer, James Ayrton Close, equal; Edwin Thomas Henderson, Norman Victor Grierson, equal; Norman Crichton Bell, Garbut Thomas Wooldridge, Henry Leo Kennedy.

Third Class. — John Leahy, George Lytton Wright.

MINERALOGY.

First Class. — Frederick William Reid.

Second Class. — Percival George Wykeham Bayly, George Percy Woodville Rofe; Harley Everett Hooper, Henry Auburn Pilgrim, equal; Richard Holtaway Giles.

Third Class. — Nigel Stuart Giles; John Leahy, Douglas Charles Winterbottom, equal; James Gairdner Blackmore; Harrie Walter Solomon, Samuel Gallie Phillips, Frederick Beeby Lane, Robert Crompton, Edward Arnold Penny.

MATHEMATICS.

First Year.

First Class. — Fred Clarence Stockwell, Thomas Augustus Keats, equal, Arthur Wellesley Hill Winterbottom, Donald James McLaren.

Second Class. — Thomas Charles Greenway, Sydney Wentworth Nichols, James Guthrie McEwin, Arthur Potts, equal.

Third Class. — William Camden Hotten, William Russell Luke Degenhardt, Henry Henderson Jones, Henry Macaulay Turner, Lisle Gardner Johnson, Harry Bray, Harold Wilfred Hague, Adolph Clifton Stock.

Second Year.

First Class — Frederick William Reid.

Second Class — Donald Raeburn Algernon Gehrs.

Third Class. — Charles Hartley Stokes.

MACHINE DESIGN, ELEMENTARY.

First Class. — Harley Everett Hooper, Nigel Stuart Giles, equal; Frederick William Reid, William Russell Luke Degenhardt, equal; James Guthrie McEwin; Donald Raeburn Algernon Gehrs, Percival George Wykeham Bayly, equal; Charles Hartley Stokes.

Second Class. — John Cleeve Collison; Ernest Charles Puxton, William Gwennap Anthony, equal.

Third Class. — James Gairdner Blackmore, Kenneth Maltby Robinson; John Daniel Teague Walters, William Arthur Robertson, Adolph Clifton Stock, equal; George Percy Woodville Rofe, Frederick Beeby Lane, Gerald Stedman Tolmer, equal.

MACHINE DESIGN, ADVANCED.

Part I.

Second Class. — Arthur John Spiller Wright.

Part II.

First Class. — Harry Wheeler Brown.

ELEMENTARY MECHANICAL DRAWING.

First Class. — David Adanson, Lloyd Arden Higginbottom, equal; Charles Fordham.

Second Class — Edmund Russell Dumas, Charles Edmund Bayly, Arthur Robert Kimber, Karl Otto Swan.

Third Class. — Roy Darton Hack, Frederick Stephens Holder, Ira McPherson, George Edwin Lea, William Edgar Walters, Horace Fairweather.

PHYSICS, ELEMENTARY.

First Class.—Arthur Wellesley Hill Winterbottom.

Second Class.—Donald James McLaren, Fred. Clarence Stockwell.

Third Class.—Alfred Henry Piper Lowry, Thomas Augustus Keats, equal; Edward Thomas Columbus Fitzgerald, Henry Henderson Jones, Arthur Potts, Louis Laybourne Smith, William James Cowell, Thomas Charles Greenway, equal; Gerald Stedman Tolmer, Harry Bray, Ernest John Neville Fisher, William Percival Henwood, Sydney Wentworth Nicholls; Harold Wilfrid Hague, Algernon Sheppard Lindsay, Cyril Arthur Saunders, equal.

STATICS, DYNAMICS, AND HYDROSTATICS.

First Class.—Frederick William Reid.

Third Class.—Charles Hartley Stokes, Donald Raeburn Algernon Gehrs, William Camden Hotten.

SURVEYING AND LEVELLING.

First Class.—Allan Douglas Robinson; James Ayrton Close, Percy Woods Moncrieff, equal.

Second Class.—Philip James Arthur Plummer; Norman Crichton Bell, Edwin Thomas Henderson, equal.

Third Class.—Henry Leo Kennedy, Norman Victor Grierson, George Lytton Wright.

INDUSTRIAL CLASSES

CARPENTRY.

First Class.—Ernest John Neville Fisher.

Second Class.—Fred Clarence Stockwell, Lloyd Aiden Higginbottom, Henry Henderson Jones, Nigel Stuart Giles.

Third Class.—William Percival Henwood, Alfred Henry Piper Lowry, Donald James McLaren, Herbert Shaw Waterhouse; William James Cowell, Cyril Arthur Saunders, equal.

ENGINEERING.

First Class.—James Guthrie McEwin, William Clement Usher, Frank Newland, Arthur Fairweather, Ross Hayter Fergusson.

Second Class.—John Arthur Epsley, Ernest George Whitehill, Arthur Noon.

Third Class.—James Sharley.

FITTING AND TURNING.

First Year.

First Class.—Frederick William Reid, Percival George Wykeham Bayly.

Second Class.—Robert Ross McLean, Nigel Stuart Giles.

Third Class.—James Gairdner Blackmore, Edward Hosking, Ernest Charles Puxton, Robert Crompton, Edward Thomas Columbus Fitzgerald; Alfred Earle, William Gwennap Anthony, Hubert Allan Fergusson Lawton, equal

Second Year.

Second Class.—Frank Newland, Harley Everett Hooper, Donald Raeburn Algernon Gehrs.

PATTERN-MAKING.

First Stage.

Second Class.—Albert William Fletcher, Frank Newland.

Third Class.—Henry John Fletcher.

SANITARY PLUMBING.

Preliminary Course.

First Class.—William Miller Dawson, David Miller Dawson, Edgar Charles Davey.

Second Class.—James Percival Howard Fabian, Peter Smith Dawson, David Morton, Arthur William Cunnew.

Third Class.—Thomas Baker, Edgar Roy Matthews, George Naisbit, Samuel James Bell, John Wallis.

Advanced Course.

First Class.—Alfred William Kneebone.

Second Class.—John James O'Brien.

PREPARATORY COURSE.

Vincent Nestor Jones, Hugh Formby, Robert Martin Angell, Arnold Edwin Weidenbach, Edgar Francis DuRieu, Philip Mottram, John Andrew Jelley, Kenneth Campbell Church, Charles Vaudrey, John Max Leppinus.

EXAMINATION—FEBRUARY, 1898.

Passed in mathematics (first year), Percival George Wykeham Bayly; passed in carpentry, Percival George Wykeham Bayly; passed in preliminary assaying, James Ayrton Close.

SPECIAL PRIZES AND DIPLOMAS.

The following are the winners of the diplomas:—

Metallurgy.—Norman Crichton Bell, James Ayrton Close, John Cleeve Collison, Edwin Thomas Henderson, Henry Leo Kennedy, Percy Woods Moncrieff, Philip James Arthur Plummer, Allan Douglas Robinson.

Metallurgy.—Norman Crichton Bell, James Ayrton Close, John Cleeve Collison, Edward Thomas Columbus Fitzgerald, Norman Victor Grierson, Clement Alfred Hack, Edwin Thomas Henderson, Percy Woods Moncrieff, Philip James Arthur Plummer.

Mechanical Engineering.—Harry Wheeler Brown.

The prizes were as follows:—

£50 for best student in mining associateship course, who, having started in 1896, finished this year, P. W. Moncrieff.

£50 for the best student in metallurgy course, who, having started in 1896, finished this year, P. J. A. Plummer.

Surveying Class.—£1 1s. N. V. Grierson; 10s. 6d., P. W. Moncrieff.

Carpentry Class.—Home-work and terminal examinations—First, F. C. Stockwell; second, E. J. N. Fisher; third, H. H. Jones

Plumbing Class.—Senior division, gold medal, A. W. Kneebone; junior division, book, W. M. Dawson.

The surveying prizes were offered by the instructor, and the plumbing prizes by the Master Plumbers' Association.

Good News for Students.

After the demonstration the president received a letter from Mr. Robert Barr-Smith stating that he would offer two prizes of £50 each for students entering next year and completing the course in 1901. It is anticipated that this example will be followed by other of our well-to-do colonists, who have acquired their wealth from mining industries and manufactures.

Intending subscribers can obtain all necessary information from the Registrar, Mr. S. Hughes, North Terrace, Adelaide.

The following Information is Extracted as to New Works, Repairs, and Additions under the Charge of the Superintendent of Public Buildings.

FROM THE PUBLIC WORKS REPORT, 1897-8, LAID ON THE TABLE OF PARLIAMENT ON THE 9TH DECEMBER LAST.

New Art Gallery.

The contract for this building was let to the firm of N. W. Trudgen in December, 1897, and the work started in January, 1898, the foundations, which cost £537 12s. 3d., having been previously put in by the department by day work. The contract price for superstructure is £18,600. The design is Roman Doric. The ground having a considerable fall necessitated a basement, the northern end of basement being designed as store and workshop for framing, packing, &c., of pictures. Auburn stone, of a bluish color, has been used for basement, while Murray Bridge stone, from Lane & Opie's quarry, Cowan's Swamp, is being used above the base exclusively for external work. The building will consist of four galleries, each 45ft. by 25ft., and one 100ft. triple gallery, to be called the "Elder Gallery," out of compliment to the munificent gift of £25,000 for purchase of pictures by the late Sir Thomas Elder, G.C.M.G.

The galleries will all be lighted from curved glass ceilings, with the coves, &c., filled in with stamped and moulded zinc and steel panels. The building will be fireproof, the floor being cement on coke cement concrete, carried on iron joists. A porch, designed to stop inrush of hot and cold air, will stand in front of building.

New South Australian Museum—Wood Floor.

It having been decided to put in heating apparatus to the new museum, a contract was first let for putting down a wood floor over the tar pavement, every precaution being taken to stop every possible aperture where the white ants could effect an entrance. Hot-water pipes have been fixed, and linoleum placed on the floor. The suggestion that the reported injury to some of the specimens was not caused by damp arising from the floor has been borne out by the destruction of a number of valuable specimens from other causes. There can now be no doubt but that excessive use of salt in the preparation of the skins has had much to do with the alarming reports which from time to time emanated from the museum authorities, and for which the floor of the museum was so unjustly blamed.

Burra—Hospital (Erection of Isolation Wards, &c.).

These additions, mentioned in last year's report, have been completed, at a total cost of £255 14s. 6d.

Caltowie—Post Office (Additional Room, of Galvanized Iron).

A new galvanized-iron room has been added to this post office, at a cost of £39 10s.

Henley Beach—Police Station.

Plans have been prepared and tenders called for the erection of a police station at Henley Beach. The building will be of brick, and contain five rooms, with verandah back and front. Two cells in brick, and a stable and forage-room in galvanized iron will also be erected, and, in addition, the site will be fenced. Estimated cost, £750. The site was purchased at a cost of £249 15s., but half the area will be available for some other Government purpose, or for sale.

Port Pirie—Hospital (Erection of Isolation Wards and Nurses' Room).

In order to provide extra accommodation at the above hospital a building containing two wards, to hold three beds each, and an attendant's room between the wards, is being erected. It is to be of stone, with brick dressings, and will have a verandah running right round, with lavatory fitted up in one corner of verandah. A detached room, to accommodate two nurses, is also being erected in similar style to the wards. Contract amount, £650; £250 of this amount was subscribed locally.

Parkside—Lunatic Asylum (New Wards for Chronic Excited Patients).

Although the plans for this work were well in hand at the end of last financial year, tenders were not called until June last. The foundations, however, were completed under a separate contract for £390 in September, 1897, so that they will have had good time to set before the superstructure is erected. The new building will be of two stories, and built in brick, and, as mentioned in last report, will be up to date—economical, strong, well-ventilated, &c. It will contain sleeping accommodation for 100 patients, a large dining-room, workroom, attendants' rooms, bathrooms, lavatories, &c. Estimated cost, £5,850, independent of fencing, forming grounds, and furnishing.

Redruth—Gaol (Converting the Redruth Gaol into a Reformatory for Girls).

This work, mentioned in last year's report, has been completed, at a total cost of £655 4s. 6d.

Rosewater—Police Station.

This building, described in last report, has been completed, at a cost of £505 13s. 3d., independent of the cost of site, which was £190 10s.

Roseworthy—Agricultural College (Wine Cellars, Second portion of).

At the urgent request of the Professor of Viticulture the second portion of the cellars has been erected, constituting with the portion previously erected one-half of the originally-designed cellars for the college. Cost of latest work, £597 6s. 8d.

Thebarton—Post and Telegraph Office.

A tender has been accepted and the work of building a large suburban post office at Thebarton well advanced. This building will contain a large office, telegraph lobby, letter-carrier's room, and strong-room, and in addition there will be five living rooms for the postmaster. It will be built of bricks with Murray Bridge stone bands and sills, &c., and when completed will fill a long-felt want. Contract price, £960. The land cost £69.

Wirrabara—Post Office (New Room).

A galvanized-iron room has been added to the above post office at a cost of £48 4s.

Aldgate Valley—School and Residence.

This school, to accommodate 100 children and with residence attached, has been completed at a cost of £973 11s. 2d.

Athelstone—School and Residence.

This school and residence, which was described in last year's report, has been completed. Total cost, £1,032 12s. 6d. The ground cost £51 10s., and was fenced by the department at a cost £25 2s. 6d. Total cost, £1,109 5s.

Brinkworth—School and Residence.

This building, which was started at the end of last year and described in last year's report, has been completed at a cost of £497.

Edwardstown—School and Residence.

In order to provide school accommodation for the children of the blockers residing near Edwardstown, a large school, to accommodate 150 children, is being erected. It is to be built of brick, with Murray Bridge stone sills and lintels, and will contain a large schoolroom, 43ft. by 22ft.; classroom, 22ft. by 22ft.; large shelter-shed, porch, and five living rooms, with front and back verandah, for the teacher. The site, which contains three acres, has been fenced departmentally, a hedge planted right round, also ornamental trees. Contract price for erection of school and residence, £1,350; cost of site, £75; fencing, etc., £47 12s. 4d.

Happy Valley—School and Residence.

A tender has been accepted for the erection of this school and residence, and the work started. The building was specified to be built of stone, with brick dressings, but contractor offered to build in brick, and his offer was accepted, and will contain a schoolroom to accommodate forty children, three living rooms for the teacher, shelter-shed, out offices, tank, &c. Contract price, £564.

Johnburgh—School and Residence.

Plans have been prepared and tenders called for a school and residence. It will contain a schoolroom to seat over fifty children, four living rooms for teacher, shelter-shed, verandah, &c., and is to be built of stone, with brick dressings. Contract price, £689.

Maylands—School and Residence.

In order to provide school accommodation for the district of North Norwood and Maylands, plans have been prepared and tenders called for the erection of a large school and a teacher's residence. The school building, which is somewhat similar in design to Rose Park school, will be built in brick, with Murray Bridge stone bands, &c., and the teacher's residence, which is to be a separate building, will be built of similar materials. The school building will contain three large schoolrooms, each over 40ft. long by 22ft. broad; two classrooms, each 22ft. square; and an infants' or Kindergarten room, 38ft. by 22ft., with gallery at one end to seat eighty small children. There will be a large shelter-shed at the back, and verandahs, with lavatory accommodation. In addition, the building will be surrounded with asphalt 6ft. wide. This school, when completed, will accommodate over 550 children. The residence for teacher will contain five living rooms, and have verandahs back and front. Estimated cost, including fencing, £3,500; cost of site, £357; total estimated cost, £3,857.

Richmond—School and Residence.

A tender has been accepted and the work started for building this school and residence. The building will be of brick, with Murray Bridge freestone dressings, and will contain a schoolroom to accommodate 100 children, shelter-shed, and five living rooms for teacher, with verandahs back and front. The site has been fenced and planted with hedges and ornamental trees, by departmental labor. This building will be ready for opening in September, 1898. Contract price, £1,021; cost of site, £151 19s.; cost of fencing, &c., £46 18s. 6d.; total, £1,222 17s. 6d.

PUBLIC SCHOOLS.

Angaston—School (Additional Classroom).

A tender has been accepted and the work nearly completed of building an additional classroom to accommodate forty extra children. This addition will be in stone, with brick dressings, to correspond with existing school, and the contract amount is £273.

Campbelltown—School and Residence (Additional Classroom).

A classroom to accommodate fifty more children has been added to this school, at a cost of £333 17s. 10d. It is built of stone, with brick dressings, to correspond with the original building.

Cockburn—School and Residence (Additional Classroom).

A tender has been accepted and the work started of building an additional classroom to the school. It is to be built of iron, and will accommodate thirty extra children. Contract price, £97 10s.

Crystal Brook—School (Additional Classroom).

An additional classroom, to accommodate between seventy and eighty extra children, has been added to this school, at a cost of £315 17s. 5d. It is built in stone, with brick dressings, to match existing building.

Goodwood—School (Additional Classrooms).

Two large classrooms have been added to this school during the year, at a cost of £635. They are built of stone, with brick dressings, and will each accommodate about sixty extra children. They practically form an extension of the adjacent classrooms, archways 14ft. wide being formed in the walls between old and new classrooms.

Morgan—School (New Classroom).

This classroom, mentioned in last report, has been completed, at a cost of £202 15s. It will accommodate forty extra children, and is built in stone, to match original building.

Mylor—School and Teacher's Residence (New Room).

An additional room of galvanized iron has been added to the teacher's residence, at a cost of £60 10s.

Nailsworth—School (Additional Classrooms).

These classrooms, mentioned in last report, have been completed, at a cost of £734.

Petersburg—School (Additional Classrooms).

This work, described in last report, has been completed, at a cost of £614 12s. 6d.

Thebarton—(School Additions).

This addition, which consists of a large infants' classroom, and was described in last year's report, has been completed, at a cost of £564 16s. 9d.



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NOTES AND COMMENTS.

The standard weight of the bushel of wheat for season 1898-9 has been fixed by the Chamber of Commerce at 63lbs. Circulars were sent to the trade and to eighty-nine Branches of the Bureau, and in response thirty-one samples were received, only nine being from the Bureaus, most of which declined to forward samples, as the Chamber of Commerce excluded all below last year's standard, viz., 62lbs. The samples received, when averaged, measured, and weighed, gave more than 63lbs. to the bushel, but the members of the corn trade section of the Chamber thought it best in the interests of the colony to fix the standard at 63lbs. Considerable dissatisfaction exists amongst farmers as to the method adopted by the Chamber in arriving at the standard, which many claim is higher than is warranted; consequently a large quantity of otherwise good milling wheat is either refused altogether or the price is docked considerably. With the low prices prevailing at present this docking is a very serious matter to many, and merits the attention of buyers. Last season the standard bushel was fixed at 62lbs., and in the two previous seasons at 63lbs.

With wheat at 2s. 6d. per bushel at Adelaide and 2d. to 4d. less at outports and country stations it behoves our cultivators to seriously consider whether they cannot more profitably dispose of their grain by first converting it into milk, meat, or eggs. For topping up pigs it is undoubtedly worth more than the price now offering, while with poultry of the right sort and properly managed, it should be at least worth 50 per cent. more than the local price. A member of the Inkerman Agricultural Bureau suggests that as feed for fat stock and dairy cows crushed corn is worth more than 2s. 6d. per bushel, and our farmers might do worse than conduct careful experiments to test the matter for themselves.

At Spreckles, California, the largest sugar-beet factory in the world has just been completed at a cost of over £500,000. The building is of five stories, and is 582ft. long by 102ft. wide. It is expected to turn out 450 tons of sugar daily from about 3,000 tons of beet. The annual output is expected to reach 60,000 tons of sugar, for which about £350,000 will be paid to growers for the raw beet. As the land is only cropped once in three years, 100,000 acres will require to be cultivated to keep the factory going.

Very few people realise what an enormous quantity of water is required for the production of even moderate crops. From numerous observations, both in Europe and America, it has been found that from 300 tons to 500 tons of water are, on the average, required to produce one ton of dry vegetable matter (*Rural Californian*). Two tons of oaten hay required over 1,000 tons of water per acre to produce it. This quantity of water is not in all cases obtained from rainfall. Some soils at least possess considerable power of absorption from the atmosphere when the land is kept well tilled. Of course tillage also prevents escape of moisture from the soil, so that frequent surface stirrings will always prove beneficial on every soil, even though absorption of moisture from the air may not thereby be promoted.

The German Government will not allow any dried or preserved fruits to be imported if they have been subjected to sulphur fumes, or have been dried upon galvanized-iron trays or sieves. All authorities are agreed that the sulphate of zinc absorbed by fruit from zinc trays, &c., is poisonous, and some are of opinion that sulphuric acid, imparted to fruit when "sulphurising," is injurious; but the fact remains that fruit treated with sulphur or dried on zinc or galvanized trays, &c., is not allowed to be imported into the German territories.

The experiments with wood wool for packing in with apples for export having proved its suitability, the Hon. Minister of Agriculture has imported 6 tons of the material for our apple exporters. This can be obtained from the manager, Produce Export Department, Adelaide, at £1 3s. 4d. per hundredweight, the actual cost price landed in Adelaide. Wood wool is much better than paper shavings for the purpose mentioned, and at 2½d. per pound costs 1½d. per case. The Produce Department has also a supply of wrapping paper with the depôt brand imprinted on it, and exporters may obtain same at cost of the paper alone, viz., 10½d. per packet of 480 wrappers.

In many gardens a large number of peaches and apricots have been furrowed by a caterpillar while quite green. This is the larvæ of a *Cacaecia* moth, probably a native species. It is quite distinct from the codlin moth, to which many people have attributed its ravages, and even as a caterpillar can be readily distinguished from the codlin moth caterpillar by anyone well acquainted with the latter.

Of something over six millions of bushels of apples annually imported into Great Britain, Canada sends about 44·5 per cent., United States about 44 per cent., and Australasia 2·5 per cent. The value per bushel for the respective countries was, in 1896, 4s. 11d., 5s. 2d., and 11s. 7d. per bushel; the high price of Australian fruit being of course due to its coming on the market in the off season. It will doubtless be a surprise to many to know that the Canadian export of apples to Great Britain is 30,000 to 40,000 cases greater than the export from the United States.

For the small fly known as the Pied Fly Bug, the Rutherglen Fly, &c., which has done so much mischief to vines, tomatoes, &c., Mr. C. French, the Victorian Entomologist, recommends the following treatment:—"Take 2galls. of kerosine, $\frac{1}{2}$ lb. of soap, and 1lb. of pyrethrum. Boil the pyrethrum and soap in a small quantity of water, and when boiling take from off the fire to add the kerosine." Then churn the mixture violently for ten minutes, to thoroughly mix the kerosine with the soap and pyrethrum, and afterwards strain well. Add 15galls. to 20galls. of water, and spray the plants infested."

By official notification from the Department of Agriculture of New South Wales, dated December 28th, 1898, exporters of fruit to that colony are warned that, under section 9 of the Vegetation Diseases Act, 1897, it has been decided to proclaim black spot (*Fusicladium*) to be a fungus within the meaning of the Act, and, as a necessary sequence, no fruit affected with black spot will be allowed to be introduced into New South Wales.

A considerable amount of interest has been evoked through a statement made in many newspapers that a bird called "Kohlmeise" (*Parus major*), in Germany, keeps the codlin moth in check. Although this bird is partly insectivorous, it does considerable injury to fruit, and lives also largely on seeds.

The San José scale (*Aspidiotus perniciosus*) has quite recently been discovered in three orchards near Fremantle, West Australia, and was probably introduced with fruit trees from near Sydney. The Department of Agriculture has ordered that the whole of the affected trees shall be rooted up and destroyed. Had those trees been treated with hydro-cyanic acid gas before being planted this trouble would not have occurred. "Familiarity breeds contempt," and it is stated that in portions of the United States where the San José scale has become thoroughly established the fruitgrowers no longer dread it. The same absence of dread of smallpox is characteristic of the people of certain countries where it is always present.

Those who eat plentifully of fruit, and abstain considerably from starchy foods and meat, are likely to live long, and remain lissom for a much longer period than those who live largely upon bread, beef, and similar food containing a deal of calcareous matter. Fruit should be the natural and chief diet of all people living in hot climates. Apples and grapes are especially beneficial in cases of gout, rheumatism, and generally where a rotund and obese habit of growth is present.

Thunderstorms used to be frequent in the earlier days of South Australian settlement, owing doubtless to the presence of scrub and other timber, which generated a good deal of electricity. Lightning used occasionally to cause the death of farm animals which happened to seek the slight protection afforded by the wire fences. This trouble might have been avoided had iron posts been used at every 100 yards, whereby the electric fluid would have been conducted to earth instead of into the bodies of the horses, cattle, or sheep.

In a number of districts the authorities are now having the star thistles on the roadsides cut up. As the plants are in full flower the seeds will mature, and on a windy day they may be seen blowing across the adjoining paddocks, scattering their seed broadcast, so that it is easy to imagine the net gain (?) of the expenditure now being incurred. When will those responsible for carrying out the Noxious Weeds Act learn that it is not only useless, but an absolute harm, to cut up the weeds after they are in flower unless they are immediately gathered and burnt.

All plants of the goosefoot family, such as beets, mangolds, and several varieties known here as saltbush, will thrive on alkaline soils; and as they are all much liked by cattle and sheep, it may be worth while to utilise such land in this way. *Modiola decumbens*, a malvaceous plant, luxuriates on strongly alkaline soils, and is very nutritious for sheep and cattle. It is a native of Chili, and would do well in South Australia. It roots freely at the joints and soon takes possession of the soil. Jerusalem artichoke (*Helianthus tuberosus*) thrives on moderately saline soil; also spinach, onions, celery, asparagus, and several species of grasses.

Another plant which will grow well upon alkaline or brackish soils is the common sunflower. In Russia 700,000 acres are regularly cultivated with this plant. As much as 50 bush. of seed per acre is a common crop; and in Gippsland, Victoria, it has been stated that 80 bush. per acre have been gathered. The seed has lately been quoted at 8s. per bushel in London, but probably a lower price would have to be accepted were a cargo of seed put upon that market. The seed is crushed for its oil, and is used to some extent for feeding poultry and livestock generally.

Chenopodium quinoa is largely cultivated on salt and alkali soils in Chili and Peru for the sake of its farinaceous seeds, which are extensively used as an article of food. They are prepared either by boiling in water like rice or oatmeal, resulting in a kind of gruel, which is seasoned with Chili pepper and other condiments; or the seeds are slightly roasted like coffee, boiled in water and strained, the liquor being used with seasoning as above. This latter preparation is a favorite with the ladies of Lima, and is called "carapulque." The seeds are known as "quinoa." Strangers usually do not like this food; but soon become accustomed to it. There are two varieties used, one known as white and the other red quinoa—the former is the better variety.

In the presence of the Ministers of Agriculture of the various colonies at Kirk's Bazaar, Melbourne, an exhibition of branding stock with Gibson's patent liquid brand was given. There were, in addition, many leading stockowners, tanners, &c., present. The brand is dipped into the liquid and applied to the skin; the hair soon perishes, and the brand shows out distinctly. A cow was shown which had been branded eighteen months previously, and had shed her coat twice, the brand being still quite plain. A tanned hide which had been branded with this liquid was also shown. There was only a faint mark or stain of the brand on the outer cuticle, the fibre being uninjured. It is claimed for this patent brand that it is easily applied, cheap, lasting, painless, and can be applied in all weathers. The cow branded at the meeting referred to is to be sent first to Brisbane and then to South Australia for exhibition.

American agricultural papers state that the dipping of cattle for destruction of the disease-bearing tick has been so efficacious that the Department of Agriculture now allows Southern cattle to be transported anywhere, upon proof that they have been properly dipped under the supervision of an officer of the department in a bath containing a solution of 86lbs. of sulphur in 1,000 gallons of extra dynamo oil.

The French Department of Agriculture maintains 3,000 pure-bred stallions at twenty-two stations throughout France. The charge for service is 6s. in each case. Last year 163,597 services were recorded, of which 2,715 were thoroughbreds, 102,279 half breds, and 58,087 heavy draught mares. Additionally, patents of approval were granted for 1,250 stallions belonging to private individuals. Permission for service was also granted to owners of several other stallions.

Equine and ovine ophthalmia appear to be prevalent in some parts of the colony. This is rather contagious, and is usually conveyed by the common house flies from one animal to another. The remedy is to separate the affected animals and place them in a shed, excluding light as much as is reasonable. Make a wash with 4ozs. veterinary opium in 1qt. of rainwater (some spirits in the rainwater will improve it), and wash the eyes of the animals twice a day for a week. If not quite well then wash the eyes once a day till recovery is complete. Such is the recommendation of Mr. C. J. Valentine, Chief Inspector of Stock.

The South Australian Agent-General has forwarded to the Minister of Agriculture full particulars concerning an international exhibition, to be holden at Glasgow in 1901, opening about March, and continuing for six months. Possible exhibitors may learn all about this exhibition by consulting the prospectus.

PREVENTION IS BETTER THAN CURE.

Some very illogical statements have recently been made by people who are sufficiently intelligent to have avoided such mistakes by the exercise of their brain power. They have protested against spraying with Paris green, against bandaging, and against being compelled to pick up and gather fallen and codlin moth infected fruit. They have asserted, without the slightest foundation in truth, that the larvæ or caterpillars of the codlin moth freely attack tomatoes, potatoes, plums, and other fruits and vegetables, and that the insect lives upon stringybark and other trees in the bush. Some of these statements are simply made in error, because the allegators cannot tell the difference between one caterpillar or moth and another caterpillar or moth of an entirely different genus and species, and some assertions are made rashly and without a care whether true or not. There is a small fawn-colored or light-brown moth, the caterpillar of which will eat into the centre of apricots, plums, and tomatoes, but it is a native, and is quite distinct from the codlin moth, and not likely to prove anything like so destructive. There are also a few others which do a little damage in the same way. As to stringybark and other forest trees, it is quite well known that the caterpillars of the codlin moth must have the *fruits* of some of the Rosaceæ family (apple, pear, &c.) to live upon, though they may eat a few bites of the leaves of the same tribe during the first day or two of their life;

therefore they could not live upon stringybark and other forest trees. If such trees were growing within a few feet of the apple, pear, or quince trees the caterpillars of codlin moth might hide under the bark or in crevices of the forest trees for the purpose of undergoing their changes into chrysalids and then to moths, but the moths would fly to the nearest apple, pear, &c., tree to deposit their eggs. If their eggs were deposited on the stringybark or other forest trees the caterpillars emerging from the eggs would die of starvation. Some of those who protest against spraying, bandaging, &c., admit that the first brood does comparatively little damage, but state that it is the and second later broods which destroy such large quantities of fruit. Do they consider whence come the second and later broods? Each female moth of the first brood—and there is not a very great number of them—will drop from fifty to 100 eggs, seldom more than one on each fruit, and each of those eggs will produce a caterpillar that will destroy one apple or other fruit. Would it not pay well to use every means to destroy the caterpillars and moths which produce those second and later broods? It is not safe to despise the videttes and skirmishers of the great army of ravagers that follows in their wake; and certainly in the case of the codlin moth and other pests we can prevent the creation of the great army by destroying the parent which produces it.

In some parts of the colony the cereal crops have been destroyed wholesale, year after year, by armies of caterpillars and by myriads of underground grubs. The owners of those crops reckon that their annual losses range individually from £20 to £100, in addition to the value of the labor expended in rolling, harrowing, scattering lime, &c., in the endeavor to destroy the pests. Is it possible to devise some means, by united effort, to cope with the evil? The army caterpillars of the South-East seem to eat only the flag of the wheat plant; about one-eighth of an inch of the stem of the barley plant, letting the head drop on to the ground; and the ligule connecting the bell of the oat, the seed dropping to the ground in this case also. Large fields of oats and barley are completely ruined in this way; but, so far as we know, no attempt has been made to lay seductive poisoned food in their tracks (they travel from field to field in solid phalanx), nor to spray them with thick tar water, nor to entrap them in trenches. There must be a period when these army caterpillars are very minute, existing in large compact bodies on the grass paddocks; but no one seems to have looked for them at that time, or to have devised means for their extinction. Farmers delay until the enemy is actually in their crops, and then their trouble commences. The farmer owning the crop next beyond sees the caterpillars coming, but only waits in fear and trembling; he does not seem to know what to do, and does nothing.

On Southern Yorke's Peninsula the farmers have suffered terrible losses through the ravages of the grub of a beetle of the cockchafer family. One farmer estimates his loss for this year at 250 bags of wheat (about 1,000bush.) through this grub. It feeds underground upon the roots of the cereals, and cannot, therefore, be poisoned or destroyed by any known means. But about November and December the great majority of the grubs come forth in their beetle stage of existence, and, it is said, are in the habit of congregating in great numbers on stumps, posts, &c., in the evening, where they remain partially torpid until the sun is pretty high next day. Where such heavy losses have to be dreaded the question arises whether it would be worth while to subscribe a considerable sum to pay for collecting every comeatable beetle, in order to prevent reproduction of the species as far as possible. If each female represents only fifty grubs for next year's ravages it seems possible to reduce the numbers of the enemy considerably in this way.

We have often before stated that the common crow is very active in digging up and eating the grubs of beetles, and where he pulls up a plant on the field

it is pretty certain that there was a grub at the root. The common lapwing or plover, the lark, quail, wagtail, and several other birds which live chiefly upon the fields destroy great numbers of caterpillars, grubs, beetles, and other insects should be strictly protected; but it is the practice at many country shows to offer prizes to school children and others for "collections of birds' eggs," and not unfrequently the guns of amateur sportsmen are responsible for the destruction of numbers of insect-eating birds, killed merely for "practice," or for what they wantonly call "sport."

STAND BY THE QUALIFIED OFFICERS.

In a communication addressed to the editor of *California Fruit Grower* by H. P. Stabler, of Yuba City, a member of the Board of Horticultural Commissioners of Sutter county, that gentleman says in part:—"For several years I have appreciated the fact that the *Carpocapsa pomonella* (codlin moth) is the most thoroughly disseminated pest in the country. Every apple and pear growing district is plentifully supplied with specimens. While it may never be entirely exterminated, yet thorough and systematic spraying will undoubtedly keep it in check, so that from 75 per cent. to 90 per cent. of a pear or apple crop may be marketed. Mr. A. Block, of Santa Clara, has had the best results in this work that I have observed in the State. By at least three and sometimes four applications of the Paris green remedy, Mr. Block has usually succeeded in saving more than 90 per cent. of his pears.

"The action of Alexander Crow, quarantine officer of the State Board of Horticulture, has the approval of the horticultural commissioners of Sutter county, and I believe of every county commissioner in the State. As soon as we saw that Mr. Crow was destroying all infested fruit sent to San Francisco we published in the local papers a warning to fruitgrowers, and issued a notice to growers in this county to comply with the law. As soon as growers know that all shipments of infested fruit will certainly be destroyed on arrival in San Francisco and other markets a great effort will be made to eradicate existing pests. On the other hand, the country horticultural commissioners are handicapped in their work of compelling disinfection as long as infested fruit can be marketed.

"Some years ago the pernicious scale threatened the deciduous orchards of California. A crusade was begun against the pest. When the nurserymen found that stock infested with this scale was unsaleable prompt measures were taken to eradicate the pest. To-day the *Aspidiotus perniciosus* is not to be found in our nurseries. The growers soon learned that the very life of their trees was in danger from this scale, spraying with the "lime, salt and sulphur" remedy was generally resorted to, and this scale is now practically unknown in our orchards. Destroy all shipments of fruit found to be infested, and shippers and growers will soon solve the codlin moth question. As no one can afford to raise unsaleable fruit the practice of spraying will become general, with results accordingly beneficial."

There is little or nothing to add to Mr. Stabler's views as given in the foregoing. When he says destroy all shipments of infested fruit and the codlin moth question will be solved he states a self-evident fact. He strikes at the very root of the evil. Persistent action along this line will result not only in the grower refraining from shipping wormy fruit, but it will result practically in his not having any to ship even if he had the disposition to do so. The most effective way to rid the orchards of California of scale and codlin moth is to uphold the qualified officers in their acts of fruit condemnation and confiscation. The gainers in the end will be the orchardists themselves.

The Pajaro valley this year has the largest crop of Newtown Pippins in its history, and the codlin moth has not done as much damage there as formerly. The orchards are unusually free from the pest, though it is said the preparation used in spring spraying killed the foliage on many trees, and this has caused some complaint. If the truth were known the unsatisfactory result spoken of would doubtless be found to have been caused by careless work in preparing the mixtures, or in their application, or both.—*California Fruit Grower*.

SUN-DRYING FRUIT.

A small quantity of fruit can be dried on the roof or any flat surface exposed to the sun where it will be out of harm's way, but with any considerable quantity it will pay to make a few trays for the purpose, as they save a lot of trouble. The best and cheapest tray is one made of 4ft. 6in. Oregon laths. The laths are nailed side by side to a cleat 2½ in. by 1½ in. at each end, to form a tray 4ft. 6in. by 2ft. 3in. A strip is nailed across the middle, and also diagonally, to give stiffness to the tray, and a ¾ in. rim is nailed round the tray on the upper side to keep the fruit from slipping off. These trays are very light, easily handled, and durable, and the fruit is turned by placing an empty tray over the fruit and turning both trays over together with a swing. The drying process varies with the nature of the fruit.

Currants are picked when fully ripe, and spread out in the sun for two or three days, when they can be gathered up into a heap and the larger stalks raked out, or be made perfectly clean by passing them through the winnowing machine. The fruit should then be sweated for a fortnight before being tightly packed in boxes to keep for use. Sweating is a process which all dried fruit has to go through. It is merely leaving it in bulk or good-sized boxes until the fruit that is too dry has absorbed the surplus moisture from that which is not quite dry enough, and the whole lot becomes equalised.

Raisins.—The grapes should be fully ripe when picked; just before they turn to raisins on the vine is the best time, provided it is not much after the middle of March. Later in the season than that there is usually some trouble to get them to dry. The Muscatel Gordo Blanco is the proper table raisin grape, but almost any fleshy grape will make a raisin sufficiently good for home use. The grapes when cut may be at once spread out in the sun, and when nearly dry on the upper side turned over to complete the drying. With good weather it will take about three weeks, and if damp weather comes on the fruit will want turning occasionally to keep it from remaining damp on the under side. The best table raisins are made in this way, great care being taken to preserve the natural bloom on the berries. The ordinary cooking raisins are made by dipping the grapes for a few seconds in a boiling lye of soda or potash, sufficient to open the pores of the skin, but not to crack the berries right open. When sufficiently scalded the grapes then quickly turn brown in the sun, and they will dry in about a week or less if it is hot weather. They, in common with nearly all other fruit, will be sufficiently dry when you are unable to squeeze any liquid juice out of them. It is a great mistake to over-dry fruit. It should be taken up whilst quite soft and pliable. When dry enough it will be found that the stalks will become quite brittle in the afternoon, when the day is beginning to cool down, and a rub over with the hand will break them all up small. This is more easily done over a ½ in. sieve, which will also let some of the small rubbish through. After being stalked they should at once, before the stalks again become limp, be put through the winnowing machine to clean them. They are then to be sweated and packed tightly in boxes. If they are pressed tightly into boxes by lever or screw press the insects cannot play up with them as they are apt to do if put away loose.

Plums and Prunes.—The fruits must be picked when 'dead ripe, and the trees should be picked over several times to secure this. They should also be graded all to one size for each tray, else some will be over-dried and others not dried enough. They should be first dipped 25secs. to 30secs. in a boiling solution of 1lb. Greenbank's concentrated lye to 15galls. of water to cover the skin of the fruit with minute cracks, which allow the water to evaporate. If the lye takes off the skin shorten the time of dipping by a few seconds. Then at once dip the fruit in clean, pure cold water to wash off all the lye and spread them out on the wooden trays and place in the sun to dry. For table or dessert prunes, when they are sufficiently dry dip them for 3min. in a boiling mixture of 1lb. glycerine in 20galls. water. Then place them in a wire-gauze protected room, spread out to dry for four or five days, and next pack them in bottles or glass jars. Whilst plums are drying in the sun they should be turned every second day. They must not be exposed longer than is necessary to dry them, so that juice will not exude when squeezed. Amateurs almost invariably dry their fruit too much. From eight to fourteen days, according to size and condition of the fruit, will suffice to dry them. The bulk of plums to be used when dry for stewing, &c., should be dipped in boiling, clean, pure water, upon the surface of which a gill of olive oil has been poured. This dip must not last longer than 20secs. to 25secs., and is intended to destroy eggs of insects which may have been deposited whilst the fruit is drying, and to improve the appearance of the dried article. Then the plums should be placed in trays or cloths spread on the floor to dry in a room well ventilated, but protected at every aperture by wire gauze to exclude insects. After 24hrs. to 48hrs. allowed to dry off the last dipping, pile the fruit up for a couple of days or more to equalise its moist condition, and then pack them away.

Apples should be peeled and quartered, or, better still, cut into rings with an apple-parer. This machine also takes out core. The cores and skins if boiled down make excellent jelly. The quarters or rings are spread out in the sun to dry. If sulphured and dried quickly in an evaporator they will have a very much better color.

Figs for drying must be fully ripe, beginning to shrivel when picked, and spread out in the sun for ten or twelve days, and turned once or twice, and put into sweat boxes for a fortnight. Before being packed they should be dipped into boiling brine for a few seconds to soften them.

HOUSEHOLD HINTS.

HONEY VINEGAR.—This is probably the best and the finest-flavored vinegar except that from wine, cider, or pure malt; indeed, many people declare it to be the best of all vinegars. Any clean barrel will do, or a cask that has had good vinegar in it. Place it in a warm situation, nearly fill it with pure soft water, and stir in 1½lbs. of honey for each gallon of water, cover the bung-hole with wire gauze or anything that will keep out dirt and insects but admit air. If a little yeast is added it will start fermentation all the sooner. A thick slimy scum will be thrown up, and should be skimmed off occasionally. Keep the cask filled with similar liquor, made at the same time and kept in a covered jar or crock. If more honey is added the process will be slower in proportion, but the vinegar will be stronger. When bubbles and scum cease to rise the vinegar is ready for use. Beekeepers can utilise the first washings of tanks, extractors, buckets, cappings, &c.

LEMON BEER.—One pound sugar, one lemon sliced thin and seeds removed, 1gall. boiling water, 1oz. bruised ginger; mix, stir, let stand twenty-four hours, strain, bottle, and cork. Ready in a week.

TOMATO CATSUP.—Stew ripe tomatoes and pass through a sieve to abstract seeds and skins. To each quart of the pulp add two wineglasses of good vinegar, half a tablespoonful of salt, and a teaspoonful each of black and red pepper; boil twelve minutes, and then bottle and seal whilst the temperature of the catsup is over 130° F.—the hotter the better.

CHLORIDE OF LIME, when used as a disinfectant, should be dissolved in water—1lb. in 3galls. water. Sprinkle on the floor or bedclothes. It will not cause discoloration. Infected clothing should be dipped in it.

BEE STINGS.—Rub on spirits of ammonia at once, after removing the sting by *scraping* it off with a knife.

A **CHEAP** and fairly durable paint for wooden fences, walls, and for galvanized iron or stone can be made by mixing 1lb. Portland cement, 4ozs. melted suet, and 1gall. skim milk. Color if desired with a little burnt umber, ochre of any shade, or some animal or bone black, or lamp black.

HOUSEHOLD CONVENIENCES.

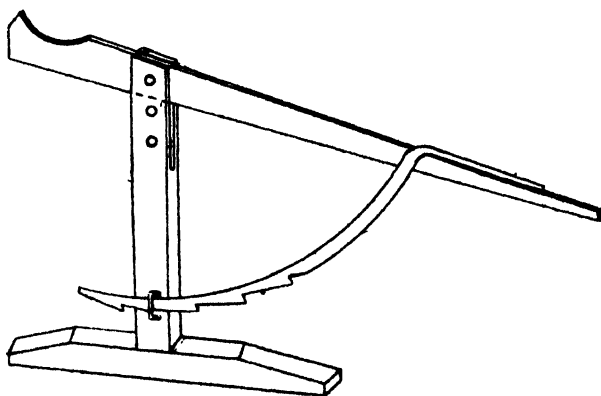
For placing sealing wax or cement on the lids of Simpson's fruit cans, or other contrivances for holding preserved fruits, a convenient can is required. The following will probably fill the want. In this the material will melt quickly, and the handle and wide spout enable the work to be done conveniently and with dispatch.

The wax can be made with a mixture of beeswax and whiting, or beeswax, oil, and "yacka" gum.



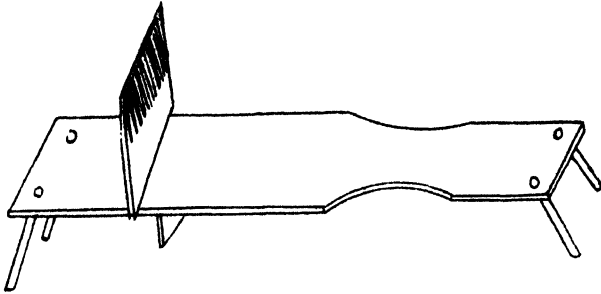
SOME HELPS FOR THE FARMER.

When one wants to look to the axle-boxes of wagons, drays, and other vehicles various makeshifts are often adopted, and sometimes they are quite dangerous to the man who has to get underneath. The sketch below shows how a perfectly safe and effective jack can be constructed to lift and hold up the heaviest vehicle whilst the wheels are being taken off for examination, repair, or for oiling or greasing the axle-boxes.



For stripping seeds off sorghum it is usual in South Australia to utilise the comb of the wheat-stripping machine, up-ended. The comb of an old machine of this sort, or a rather stout sheet of black iron may be used in the manufacture

of a more handy contrivance whereby more work can be done, and the operator may sit down at his work, so long as he has a good heap of sorghum or holcus heads or panicles alongside. He only requires to take a handful of these and draw them through the teeth of the comb. For sowing again the very best heads only should be saved, and the seed kept separate from the rest.



Mr. F. W. Dragomuller, of Lobethal, has fitted a frame with fly-wheel to his Laval hand separator, and says that the machine is now much more easy to work. The frame is 2ft. 9in. high, 4ft. 6in. long, and 21in. wide, with bearings to carry a 1½in. spindle, fitted at off end with a large wheel from an old spring-cart, and a driving-wheel from an old wheat-stripping machine to carry the driving-band to a smaller driving-pulley or wheel fitted on to the end of the spindle of the separator. The handle of the separator is shifted on to the end of the spindle opposite the fly-wheel.

BUTTER-TESTING.

By G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

A butter test was concluded at the Government Depôt at the end of last month. Twelve factories took part in the test, each supplying one 56lb. box. The manufacture of the butter was conducted upon export lines. A list of twenty questions was supplied to each maker, the answers assisting in the determination of existing faults and providing means of offering suggestions where a defect was observed in the making process. A separate report will be forwarded to each of the twelve factories associated with the test.

The average time the butter remained in the cool chamber was eleven weeks, and the average temperature of the chamber was 32°. Prior to the boxes being placed under refrigeration a practical and analytical examination was made of the samples. In the analysis the percentage of water varied from 11.5 to 13.0, and the percentage of curd from 1.5 to 2.5. It was noticeable that samples rich in caseous matter possessed a pronounced flavor, superior to the well-washed butter, a point observable in newly-made butter from superior cream. Further examination revealed the injury caused by neglect in thoroughly removing the buttermilk. The use of preservatives was deprecated; still a few factories added quantities varying from 3ozs. to 6ozs. to the 100lbs. of butter. A careful examination was made of these samples in order to find out the influence of the preservatives upon the keeping quality of well-washed and badly-washed butter. The texture, color, salting, and packing, in the majority of cases, showed considerable care and consideration on the part of the factory managers. A box of pounded pasteurised butter was amongst the list, and although the quality was high the percentage of caseous matter was above the average.

The second test was made about six weeks after the commencement of refrigeration, the temperature of the butter at this time being 34° F. Boxes

in which the buttermilk was in excess and without preservatives were showing signs of a cheesy and fatty flavor, but with no apparent rise of acid. Where no preservatives were used the condition appeared much the same as prior to chilling. In well-washed butter, with and without preservatives, no change was discernible.

On the eleventh week the third test was made. The temperature of the butter was 54° F., having been brought to that degree by a gradual rise extending over five days. A distinct cheesy and fatty flavor had now developed in boxes where the buttermilk was present, but the preserved butter was only slightly altered. Well-washed butter with preservatives added seemed to give an acid flavor, and where no preservatives were used the quality was distinctly superior. Two boxes rich in buttermilk were opened and exposed to air and light; at the close of one week a fishiness and rancidity developed, with a speedy rise of acid.

The pasteurised butter remained unaltered, notwithstanding a high percentage of buttermilk and having no preservative. To extend the test further three boxes will be shipped to England, and should they arrive there in good condition, will be returned to Adelaide for a final examination.

From what has already been said we may infer that cheesiness appears to take place in improperly-washed butter when kept at a low temperature, and that preservatives can be dispensed with when butter is entirely freed from buttermilk.

TUBERCULAR DISEASE IN DAIRY HERDS.

BY G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

The subject of bovine tuberculosis is at the present day attracting the keen attention of both the veterinary and medical professions, as well as the general public of our European countries. So alive is the general public becoming to the danger of tubercular meat and milk that precautionary steps are being adopted in households to ensure safety from the dreaded bacilli in these articles of diet. Unfortunately no real evidence is forthcoming as to the prevalence of the disease throughout our colony; still we are aware that few, if any, herds if subjected to the tuberculin test would prove to be unaffected. We have records of alarming percentages of tubercular stock in countries where the severity of climate necessitates the system of housefeeding. The insanitary conditions that exist in housing with respect to ventilation, lighting, cleansing, drainage, water supply, and air space, are all conducive to the disease. These circumstances, however, need not confirm the prevailing belief that our milking stock are practically free from tuberculosis, or that the percentage of affected animals is small and limited to our south-eastern districts. Our climate is as severe with respect to heat as the English climate is with respect to cold, and the rapid changes and extremes in temperature which we are exposed to tend to debilitate the health and vigor of our cattle, and make them as susceptible to the disease. The cattle in the colony have just emerged from a succession of severe years, when the supply of feed was far short of maintaining their bodily demands, the quantity and purity of water insufficient and injurious to health, and shelter unprovided to protect them against the climatic changes. With the seed of tuberculosis sown in animals, it thus appears reasonable to accept that the disease has, and is being afforded a fertile field to expend its virulence. The disastrous seasons have terminated the lives of many tuberculous animals; but that leaves no cause for conjecture that the remaining stock have been left in a healthy condition. The "piner" is visible in many dairy herds, and when the final stages of tuberculosis are reached, we

may guess what amount of contagion those animals have contributed to the extension of the disease. What dangers are our lives exposed to from the milk of such cows? Bacteriological examination in our colony has already proved the presence of the tubercle bacilli in a general sample of unsuspected milk.

In centrifugal separation the tendency exists for the skim milk to contain the bacilli removed along with dirt by centrifugal force. Where no attention is devoted to selection in breeding of dairy stock, the progeny of weakly and probably consumptive mothers, fed in their initial stage upon tubercle-infested skim milk, have but a poor chance of escape from the malady. In England and other European countries cows are entirely shut up during the winter months. They are allowed to roam about in the pastoral season, and special care and attention is given to them with relation to food, water, and shelter. The value of milking stock in England demands the keen eye and consideration of the dairyman, with a view to reduce to a minimum loss amongst his animals through illness. The early rearing of his young stock to health and profit cannot be left dependent upon such a weakly diet as skim milk without replacing the fat with some equally nourishing and digestible constituent. With all the care in building up a strong constitution, and attention in maintaining it, the prevalence of tuberculosis is so rampant that English authorities estimate the affected animals at the alarming figures of 20 per cent. for all cattle, and 40 per cent. for cows. Stringent measures will shortly be enforced to cope with, and, if possible, to eradicate the disease: the general public being now aware of the communicability of tuberculosis betwixt beast and man. The number of deaths in England and Wales annually from consumption is approximately 40,000; and to some extent this dreadful mortality owes its cause to the use of tuberculous milk amongst infants and those of a sickly constitution, or having a tendency to tubercular disease. The advocacy of scientific men in reducing the loss of human life is directed first to the seat of bovine tuberculosis, a separation of diseased from non-diseased milking cattle, thus ensuring the purity of the milk supply from the tubercle bacilli, the free use of the tuberculin test amongst all stock, the careful examination of slaughter-houses for diseased meat, and the destruction of the meat if found unfit for human food. The danger rests principally in the milk supply, not so much in the meat; statistics of the death rate in England lending proof to this contention. Knowing that the germs of consumption are unable to withstand a temperature of 185° F. for one minute, we are assured that well-cooked meat can possess no virulent germs.

With non-pasteurised or unskalded milk children are exposed to the danger, and consumption of the bowels (*tabes mesenterica*) is now looked upon by eminent medical authorities as having its origin in a contaminated milk supply. A marked diminution in the mortality amongst children of the poorer class in New York from intestinal complaints gives good evidence of the value of milk pasteurisation, the system having been in operation in that city for a considerable period. Doctors are unanimous in urging the simple preventive of scalding of milk (not sterilising) as a life-saving precaution for infants and grown-up people. On no account should this be omitted when the support of children is dependent upon the supply of milk from individual cows, unless one is firmly convinced of her freedom from tubercular disease. Returning to cattle, let us consider the evidence accumulated with respect to the subject of heredity. Scientific examination and practical experience furnish us with the knowledge that a tubercular bull cannot be looked upon as transmitting the disease to his offspring, although a liability exists to the dam becoming affected through outward contact with the bull. Infection is asserted to take place amongst cattle and human beings, but conclusive evidence in this point is yet demanded, although instances are cited which tend to give ground for the assertion.

Tuberculosis is caused by a specific organism which must be inhaled into the respiratory organs, or find a way into the stomach and intestines with food before disease can be set up in either case; hence wherein can it be termed hereditary. It must necessarily be that the bacilli finds a way into the air from dried sputa of diseased animals and people, becomes mingled with dust, food, and water, and thus is transmitted from one animal to another. This leads to need for further investigation when we consider the antiseptic properties of light upon germ life, and the inability of the tubercle bacilli to withstand the influence of strong sunlight. Occasionally a calf is found diseased from a tuberculous mother, but such a case is looked upon as transmission of the disease from the mother to the fœtus in uterus. Calves born of tubercular dams form a more suitable seed ground for tuberculosis, the organs and tissues of the body possessing less vigor to combat the action of the bacilli, and hence the greater liability to fall a victim to the ravages of the disease. Contagion may be assuredly taken as the greatest agent in the spread of tuberculosis; and with a view of eliminating the trouble our attention must be directed to the discovery of all affected cattle, with a view of separating, in all cases, the affected from the sound. Animals advanced in disease would require to be slaughtered and the flesh destroyed, those showing the early symptoms fattened off where a fattening tendency existed. It is considered safe to breed from a tubercular cow if not too far gone, but the calf must necessarily be removed from the mother immediately after the birth and fed upon sound and wholesome milk. Professor Bang, of Denmark, one of the greatest authorities on bovine tuberculosis, has carried into effect, with signal success, the work of suppressing tubercular disease by the above means. In April, 1897, 144,800 cattle were tested with tuberculin, and the Danish Government allot annually £6,000 to assist owners of cattle to take advantage of the test. In Belgium and France stringent measures are in force regarding the testing of cattle with tuberculin, and imported stock destined to the latter country are individually subjected to the test prior to entry. In Switzerland and Norway tuberculin is served gratuitously to owners of stock who are desirous of using it. The State of Massachusetts, in America, has made provision that no cattle will be admitted into the State without having passed the tuberculin examination, otherwise they will be examined on arrival, and if found to react will be condemned and killed, the owner sustaining the loss. In Germany action is in process towards the preparation and distribution of tuberculin.

The question may be asked, can we not diagnose the disease without resorting to the tuberculin test? The symptoms exhibited by tuberculosis are not always indicative of the trouble, but may arise from another cause, and thus lead to grave errors. Fat and healthy-looking cattle often have disease to such an extent that the lungs present large tubercular nodules. In this instance external examination is useless, and leads to a feeling of confidence in the health of an animal until too late, when a sudden falling off in flesh points to the final stage of disease. Bovine tuberculosis appears under two forms—acute and chronic. The former is generally of brief duration, death usually occurs within a few weeks. The symptoms of acute tuberculosis recorded by veterinary surgeons are as follows:—A high temperature, 105° to 107° F., quick breathing, glassy eye, dry muzzle, disinclination for food, and rapid emaciation. With a marked affection of the lungs a short cough is generally present, and the animal walks with a stiff gait and humped back. When the liver is affected the eyes may appear jaundiced; and with a diseased condition of the brain coverings the animal as a rule falls down and appears in a dazed condition. Should the bowels be the seat of disease, purging takes place, with the excreta commonly tinged with blood. With an affection of the udder tubercular lumps may be felt with the hand, and when the joints are

tuberculous lameness follows. In chronic tuberculosis the physical symptoms give little or no indication of the disease ; but the chronic form generally changes into the acute.

The following directions for using tuberculin are issued from the research laboratory of the Royal Veterinary College, London :—

I. While under the tuberculin test cattle ought to be kept in the house, fed on their usual food, and protected from draughts.

II. The dose of tuberculin for a medium-sized cow is 3 cubic centimetres, or 50 minims, and it may be varied a little above or below that, according to the size of the animal.

III. It ought to be injected under the skin with a clean hypodermic syringe. The most convenient points are in front of the shoulder, or on the chest wall behind the point of the elbow. The best form of syringe is one with an asbestos piston, as the whole instrument may be sterilised by boiling it in water for five minutes before use.

IV. The tuberculin must be injected into the subcutaneous connective tissue, and care must be taken that the whole dose is introduced.

V. The temperature must be taken at the time of injection, and at the sixth, ninth, twelfth, and fifteenth hours afterwards.

VI. Animals in which the temperature, during the fifteen hours following the injection, rises gradually to 104° F. or more, may be classed as tuberculous, and those in which it remains under 103° F. as not tuberculous. When the maximum temperature attained is under 104° F., but over 103° F., the case must be considered doubtful, and the animal may be retested after a month.

VII. The test is not reliable in the case of animals in the last stage of the disease, or in those in which the temperature is over 103° F. before injection.

VIII. The tuberculin should be kept in a cool place, and protected from light. Should it become turbid or cloudy it must not be used.

IX. The tuberculin test does not render the milk in any way injurious.

Before an animal is placed under the test the bodily temperature is always taken a number of times at intervals prior to injection, this being done in order to find out if the condition is normal, if not the test is not applied. Where the injection takes place on the animal's body, the part is thoroughly disinfected to avoid contamination with foreign germs. Tuberculin is manufactured from a cultivation of the tubercle bacilli, afterwards sterilised.

The following is an example of the rise of temperature in a reacting case, and the slight variation when no disease is present :—

Temperature Twenty-four Hours before Inoculation.		At Inoculation.	After Inoculation			
			6 a.m.	12 noon.	3 p.m.	6 p.m.	9 p.m.
Reacting ..	101·7	102·4	103·6	107·4	106·1	104·5
Free	102·0	102·1	101·1	101·9	101·6	101·1

EGG-PRESERVATION.—In Germany experiments have been made to test several methods of keeping eggs good for eight months. Twenty methods of treatment were tested on 400 fresh eggs, and three only proved to be perfectly satisfactory. Amongst the comparative failures were several varnishes, wood ashes, boric acid, salicylic acid, glycerine, bran, paraffin, alum, and combinations of above. The three completely effective agents were vaseline as a varnish, lime-water, and solution of water glass. The proportion of water glass is not stated. Limewater is made by stirring quicklime in water ; let it stand for a time, then draw off the clear water. To make the water dissolve and hold a great deal more lime, add some sugar to the water.

LIVE STOCK NOTES.

BY C. J. VALENTINE, CHIEF INSPECTOR OF STOCK.

The quarterly reports of the Inspectors of Stock for the end of the year show an increase in losses from pleuro-pneumonia and tuberculosis. The demand for store cattle caused the sale of numerous droves of cattle; and whilst the inspectors were sometimes fortunate to discover the disease before they were scattered over the country, in other instances it was not until the different lots were settled and had rested that pleuro-pneumonia broke out. Eighty diseased cattle were destroyed, 1,200 were inoculated, and 2,100 were quarantined and isolated. Virus was obtained from the Queensland Stock Institute, and also from calves inoculated for the purpose here, and the cattle successfully inoculated. An increased number of cases of tuberculosis have been noted—112 carcasses of cattle were destroyed, ten were partly destroyed, fifteen were passed for consumption, and nine were isolated for further examination. Amongst those destroyed were twenty-five cows in milk and four with the udder in an advanced stage of the disease. It is astonishing to find the carelessness with which owners will continue milking cows which show marked symptoms of disease, and in which no appeal is made to the inspectors to examine sick animals. In trifling and unimportant cases notices are frequently received.

Twenty cattle affected with actinomycosis were destroyed and eight were fattened for killing, being only slightly affected.

Twelve cattle were destroyed, being affected with cancer. Over 100 *post mortems* were made, and in a number of instances when specimens were taken and microscopically tested they revealed the presence of the disease for which the inspectors had had the animals destroyed. Numerous losses are reported from impaction, acute indigestion, asthenic apoplexy, and local diseases to which all farm stock are liable, more particularly when not properly fed.

Tick or Lice on Sheep.—The effect of previous and continued dipping has favorably affected the sheep. Although these parasites have been found in many flocks, more particularly in young sheep and lambs, a great improvement was found in the northern flocks, very few ticks being found. If a careful system of dipping is continued the pest may be eradicated from many flocks, but owners must not cease to dip because there are only a few parasites to be seen. A more favorable season will allow them to rapidly increase again. The effect of the dipping on the season's clip has been marked, and in one district it is reported as one of the cleanest and brightest ever seen.

But few diseases have been reported amongst sheep. Several reports of ophthalmia have been received, and remedies suggested. The reports of fluke and worms show but small losses.

The markets have been well supplied with fat cattle and sheep, and a much larger supply of fat lambs has been marketed, and the exports materially increased. Fresh importations of valuable Shropshire rams and ewes and Lincoln sheep have been received from Great Britain. The farmers are finding that the Shropshire cross for raising lambs for the export market is the most valuable and most suitable for small holdings.

The general health of the stock, apart from pleuro-pneumonia and tuberculosis, is satisfactory.

A large number of stock were inspected at the different markets and sales throughout the country. The importations have been heavier than usual from Queensland. The cattle were carefully examined at the boundary, and were passed in free from cattle tick, which has made no progress southward from the Territory or the Queensland tick districts.

FUMIGATION OF CITRUS TREES FOR SUPPRESSING SCALE INSECTS.

By GEORGE QUINN.

The *Agricultural Gazette* of December 8th, 1898, published in Cape Colony, contains the following statement which should be noted by growers of citrus fruits in this colony.

"All over the colony fumigation with hydrocyanic acid gas is rapidly becoming recognised as the best and withal the cheapest means for suppressing the scale insect enemies of citrus trees. A dozen fumigation outfits of large size, costing from £50 to £125 apiece have been put in operation during the last eighteen months, and many private parties are treating or have treated their own trees with outfits of less cost.

Briefly, the treatment consists of covering the trees with approximately airtight cloths, and then generating hydrocyanic acid gas within the enclosed spaces by adding dilute sulphuric acid to cyanide of potassium. The covers are removed after forty-five minutes have elapsed, when the gas will have partly spent itself.

The cloth covers for small trees are made dome shaped, while those for large trees are made as octagonal sheets or "sails." Formerly, light duck cloth coated with oil, was used for covers, but preference is now given to a much heavier cloth, which, after shrinking, is sufficiently airtight without oiling. This advance is due to the action of the Horticultural Board of Cape Colony having first demonstrated the efficacy of the treatment by treating many thousands of trees in various centres. The confidence of the growers having been gained they now see it is to their best interests to use this method, particularly in suppressing red scale (*Aspidiotus aurantii*, Mask).

To encourage and assist the growers the Board has decided to import cyanide of potassium in bulk, and sell it at cost price to them.

They also subsidise societies or clubs consisting of not less than five members, representing not less than 1,000 trees requiring treatment, to the following extent in procuring an outfit of sheets, &c. If not less than £50 be expended the Board will pay £25 towards the initial expense, or if less than £50 be expended the Board will pay half, on the above conditions, and with a guarantee that the society will begin the actual work of fumigation within four months, and fumigate not less than 1,000 trees within ten months of accepting the offer. I think the efficacy of the treatment may be claimed to have been fairly established in this colony, but the question of the cost of outfits seems to be the stumbling block in the way of its adoption here. Perhaps in the actions of the Horticultural Board of Cape Colony there may be food for thought to those interested here. In California, somewhat similar terms are made by the country Horticultural Boards. We have no such societies here, but the formation of something of the kind may be worthy of consideration.

The red scale upon our citrus trees has received a very great set back from the extremely high temperatures which ruled throughout this province during the summer of 1897-8. This insect is most actively breeding here from November until April. In the winter it is quite dormant. During the former period named above, when the insects would have been spreading themselves out upon the tender foliage and fruits of the citrus trees, the extreme heat seemed to destroy them, and now in many orangeries on trees formerly very badly infested it is extremely difficult to find a living scale. No doubt there

are some surviving, but this valuable check and assistance given by the weather should not be thrown away, and wherever this pest is thus brought well under control every effort should be made to keep it so.

It is to be sincerely hoped that our citrus growers will not be deluded into believing that red scale is exterminated, or allowing it again to increase to become a menace to the trees before taking action to suppress it.

ORCHARD NOTES FOR FEBRUARY

BY GEORGE QUINN, INSPECTOR OF FRUIT.

The fruit harvest is now well in hand, and some idea can be formed of the quantity and quality of the produce. Apricots and cherries are passed, and good prices have been maintained throughout, though the canners have no doubt gone short of their requirements.

In some districts the yield of plums has been fair, but one jam maker asked me a question to which I had to return a negative answer. The query was, "Can you tell me where I can get 1,000 bush. of good plums?"

It seems passing strange that in the midst of such scarcity hundreds of cases of plums should be sent to Melbourne by rail.

Peaches bid fair to give a moderate yield, but the neglect to thin the fruits is again much in evidence in the quality of the fruit. This was also the case with apricots.

The shipping of apples to London will commence towards the end of this month, and I believe a larger quantity will be exported than during last season. The comparative failure of the American apple crops is our opportunity for top prices, and should be fully taken advantage of, but not to the extent of forwarding inferior or damaged fruits. I wish again to repeat my former statements respecting the suitability for export of slightly hail-marked fruits where the scars have grown out to a simple russety mark, and in the judgment of the packer will not cause rotting to set in.

I am often asked how to distinguish when apples are ready to gather. The best guide is the easy separation of the fruit stalk from the lateral spur when the fruit is lifted slightly. Should the fruit be green the young spur will come away attached to the fruit stalk if pressure be applied.

This premature gathering is not only injurious to the fruit, but also reduces the value of the spur for future fruitage. The browning of the pips is also a good indicator of maturity, but I think the former method more reliable in general practice, as some varieties "go off" flavor and crispness very quickly if allowed to remain on the trees until the pips are brown.

Apples for export should be gathered when dry—that is not damped with dew or rain—and allowed to stand for several days in a fairly open shed or building to allow the excess of moisture to pass off, and the skins to toughen a little.

Our markets have been supplied exclusively with Italian citrus fruits during this summer, lemons of good quality coming to hand, but the oranges, though as smooth as an apple, and with rinds almost as thin as an eggshell, are mostly very sour, and lacking in taste. These are much inferior in flavor to locally-grown oranges, but it is possible they may have been picked in an unripe condition. If these oranges are when ripe of equal sweetness to our best it is quite time we had the particular variety grown here, on trial at any rate, whatever its name may be. These fruits are infested by two injurious scale insects, and are therefore subjected, without exception, to fumigation prior to distribution.

Any budding not already begun should be undertaken at once. These buds will not start this season, but remain dormant, therefore the trees budded

should not be cut back until the winter pruning is undertaken, and then they should be cut back to the inserted buds. All buds that have united should be carefully examined, and the ties loosened, but not yet removed, unless a complete union is observable.

The local crops of citrus fruits promise to be fairly abundant should no unforeseen accidents occur, and every effort should be made to preserve them free of diseases, and to keep the trees supplied with moisture. The practice of pumping water from wells—beautifully cool to the palate of the thirsty workman—and running it straight away to the roots of the citrus trees in this chilling condition is very strongly condemned by the American scientists who are investigating the subject, their experiments point to this practice causing the trees to shed young fruits.

It is quite possible to successfully transplant small citrus trees now if a ball of earth is attached and a good watering and mulch be applied at once.

In late districts the breaking of laterals on apple and pear trees, as illustrated in last month's issue, may still be successfully performed.

The bandages on apple, pear, and quince trees for trapping caterpillars of codlin moth should be closely examined at least each week, otherwise in mid-summer there is danger of moths emerging. The ground should be kept clean of rubbish around and near the trees, and all fallen fruits should be collected daily and submerged in water for forty-eight hours, or boiled. In no case should they be fed to animals without being previously treated thus. It must be remembered, in dealing with this pest, that the orchardist may expend labor and money in cultural, pruning, and all other operations in the orchard, but if he treats this question of codlin moth suppressing as a thing to be attended to when "slack," he will find that all his other work is thrown away, as heavy penalties will be imposed for selling the infested fruits here, and the other colonies absolutely prohibit their introduction. I wish to constantly keep the question of the proper construction of fruit storehouses before the growers as one of the chief keys to success in dealing with this pest.

The preservation of fresh fruits, as indicated last month, should be performed as they ripen.

NOTES ON VEGETABLE-GROWING FOR FEBRUARY.

By GEORGE QUINN.

The recurring spells of cool weather experienced in January have been very favorable for the operation of planting out young cabbages, cauliflowers, celery, etc., from the seed beds. Successional sowings should be made of cabbage, cauliflower, celery, lettuce, and onion in seed beds, prepared as described in our previous issues. The seeds when sown should be covered with finely-pulverised stable or cow manure. These summer sowings should be made thinly, so that the seedling plants may be lifted separately, with fair hopes of the roots remaining intact and but slight check being given to the plants on transplanting.

Ground should be prepared by being broken deeply for the sowing of parsnips, carrots, turnips, swedes, peas, beets, and prickly spinach towards the end of the month, as the nights lengthen and become cooler. Continue to make sowings of edible podded beans—so-called French beans—both dwarf and runner. The former develops more rapidly, consequently is best for late sowings.

In this climate, where the evaporation is so great and stirring the soil frequently between the plants so necessary to counteract capillary action, the

sowing of all garden crops in drills has many advantages. Tomatoes should be closely attended to, and as far as practicable the disbudding of lateral shoots followed if a good sample of fruit is sought. Tying should be followed from time to time, to keep the fruits off the wet or hot soil.

The harvesting of onions will continue along with potato digging. Greater care is necessary in the handling and storing of these very necessary crops here. Onion seeds should be carefully saved as they become ripe and the seed vessels open, otherwise the wind will shed them on to the ground.

In sheltered, cool positions fine rich beds should be made up and sowings made of salad plants, such as lettuces, cresses, radishes, &c., which should be treated in a similar manner to seedlings for transplantation.

Abundant supplies of water must be given to growing crops of beans, and a light dressing of superphosphate strewn along and forked into the surface to be watered, is very stimulating. All plants of the melon family also require abundance of moisture. Liquid manure made by dissolving a tablespoonful of sulphate of ammonia in a large bucket of water, or made by soaking fresh cow manure in water, and applying the strained liquid will be a great help. These stimulants should not be applied to the stems, but given in such a manner that they soak down to the roots. If there is any danger of the liquid manure being too strong water should be applied immediately after. Perhaps the greatest success in growing these plants lies in covering the ground over where they run with a fine mulch of stable manure, and applying water by means of a "sprinkler." This induces all of the marrow and pumpkin family to root into the ground on the running stems and become less dependent upon the main root. Keep all melons, cucumbers, beans, &c., gathered before the two former turn yellow, or before the ripening of the seeds of the latter impoverishes the plants and prevents further fructification. Where carrots, parsnips, or red beets show a tendency to run to seed they should be lifted and laid in cool sandy soil only containing sufficient moisture to prevent the roots withering. This method will check the development of "hard cores" caused by the cellular tissue changing to fibre.

In the cool elevated districts, where abundance of water for irrigation is available, sowings will be made of cabbage, cauliflower, celery, peas, lettuce, mustard, turnips, beans, radishes, carrots, parsnips, kohlrabi, celeriac, spinach, beets, &c. The thinning of turnips, carrots, parsnips, &c., will be taken in hand as required. Plantings will be made of cabbage, lettuce, cauliflower, celery, celeriac, kohlrabi, potatoes, &c., cool changes being utilised for this work as far as practicable.

OLD V. YOUNG FOWLS FOR EGG PRODUCTION.

At the Utah Agricultural Experiment Station some interesting trials have been carried out to test the relative value of old and young fowls as egg producers. The fowls used were Rose-comb Brown Leghorns, four to the pen—six pens in all. These were divided into two lots of three pens each, one-half (pens 1 to 3) having no exercise, and the other half (pens 4 to 6) being allowed exercise. Pens 1 and 5 contained old hens 3 to 4 years old; pens 2 and 6 late-hatched pullets about $5\frac{1}{2}$ months old; and pens 3 and 4 early pullets 7 months old. All the fowls were from the same yard, and the pullets had all been raised under exactly similar conditions, while the duplicate pens were as nearly as possible alike. All were fed alike except as regards quantity, and everything was carefully weighed. The food consisted of two parts bran and shorts, and one part each of chopped maize and oats fed in the morning, a little grain at 10 o'clock, and then grain again in the evening. Three times a week chopped

bones and meat was given; green feed was also provided, consisting of cabbages, green grass, and lucern, according to season. Salt was used in the mash, but with the exception of a little cayenne pepper occasionally no stimulating food was given. During winter months coal ashes were kept before the fowls, also a little gravel, and from the middle of summer oyster shells were provided. About a third of the time a male bird was in each pen, and in the figures for food consumption this is taken into account, and a fair deduction made. The old hens consumed the least food, it being valued at 53½ cents per fowl for those without exercise, and 62 cents for those allowed exercise. The late-hatched pullets consumed feed to value of 56½ cents and 61 cents respectively, and the early pullets 61½ cents and 62 cents respectively. The ration for the pens allowed exercise was practically identical. Wheat constituted the principal item of the ration, 27lbs. per fowl being consumed, other grains totalling 21lbs.; chopped bones and meat, 10½lbs.; green feed, about 9lbs., in addition to grass scattered in the pens when available.

The following table gives a summary of the results:—

TABLE.—SUMMARY OF RESULTS.

Pen.	Fowls	Total Eggs Laid.	Average per Fowl.	Value per Fowl.	Food Cost per Fowl.	Food Cost per Dozen Eggs.	Per Cent. Profit on Food Cost.
NO EXERCISE.							
1.	Old hens	231	57½	s. d. 2 4	s. d. 2 2½	d. 5	5
2.	Late pullets	550	137½	5 6	2 4½	2½	135
3.	Early pullets	631	157½	7 0	2 6½	2½	1½
WITH EXERCISE.							
4.	Early pullets	727	181½	7 10	2 7	2	203
5.	Old hens	427	106½	4 2	2 7	3½	61
6.	Late pullets	603	150½	6 3½	2 7½	2½	124

The experiment extended over a period of twelve months, during practically five months of which, when eggs were at their highest, the old hens laid no eggs at all. The early pullets gained a great advantage over the late pullets, inasmuch as they started earlier and got the benefit of the higher prices. As a matter of fact they had started laying before the commencement of the experiment, the change of quarters causing a check. If the twelve months during which they were actually laying had been taken into account, their egg production would have reached 200, and there is little doubt that this mark can be reached in future tests. It will be noticed from the table that the profit from the young fowls was roughly five times greater than from the old hens. Not only did the latter lay fewer eggs, but they averaged a lower price. During the winter months—a period of between three and four months—the birds could not be allowed outside the building.

In taking these figures into consideration under South Australian conditions the prices of feed and eggs must be borne in mind. Wheat and oats comprised two-thirds of the total feed. These compare as follows as to price:—Wheat—At Utah, 2s. 11. per bushel; average in South Australia for 1898, 3s. 9d.; oats—Utah, 1s. 1d. per bushel; South Australia, 2s. In other feed, bran was also dearer in this colony; bones, cabbage, and lucern cannot be compared, but the difference would amount to very little on the individual ration. Fowls' eggs averaged about 7d. per dozen in Utah, while in South Australia last year they averaged about 11½d. Taking these figures as a basis, and allowing 20 per cent. increase in cost in South Australia of bran, bones, &c., the results of pen 4 may be compared as follows:—Production—15doz. eggs per fowl; value in Utah, 7s. 10d.; in South Australia, 14s. 8d. Cost of feed—Utah, 2s. 7d.;

South Australia, 4s. 1d. Prices for grain last year were above the average, but the increase in the price of eggs probably balanced any increase in cost of production. In nearly all cases, however, there would be practically very little outlay for bones and green feed, as these may be termed waste products, whereas 9d. per hen is allowed for in calculating the cost of supplying the same quantity of food as was given to pen 4 in the experiment.

KILLING POULTRY.

In the latest annual report of the Canadian Agricultural Department the following advice is given as to the killing of turkeys and poultry generally.

Fast the birds for twenty-four hours previous to killing so as to empty the crop and intestines. The fermentation of food in the crop and intestines causes rapid deterioration. Give a small quantity of water just before killing, and keep the birds as quiet as possible.

The easiest and best methods of killing turkeys, is by dislocating the neck. This is done as follows:—Grasp the legs of the bird in the left hand and the head in the right, the back of the bird being upwards and the crown of the head in the hollow of the hand. Hold the legs of the bird against the left hip and the head against the right knee or thigh. In this position strongly stretch the head, at the same time bending it suddenly backwards so as to dislocate the neck near its junction with the head. The bird is killed instantly, though the body may work convulsively for some time. When the knife is used the following method is adopted. Hang the bird up by the legs, crossing the wings to prevent struggling. Give it a sharp blow on the back of the head with a stout piece of wood to render it insensible, then insert the knife into the roof of the mouth to pierce the brain, cutting it along the entire length. The bird is left hanging to allow the blood to drain out.

Geese and ducks should be killed by cutting in the roof of the mouth, the cut being lengthways across, and deep enough to reach the brain.

Fowls and chickens should be killed by dislocating the neck or by cutting into the brain in the following manner. Tie the legs together, lay the bird upon its back, open the mouth with the left hand, insert the point of the knife into the slit in the roof of the mouth, and make a firm sharp cut into the brain, cutting it along its entire length. Hang the bird for a few minutes to allow the blood to drain out. The knife should have a long narrow blade sharpened on both sides.

POULTRY NOTES.

Written for the "Journal of Agriculture and Industry."

By D. F. LAURIE.

The Poultry Tick.

Of late numerous complaints have reached me concerning this troublesome pest. The poultry tick was recognised by the late Mr. Frazer S. Crawford as *Argas reflexus*; Dr. Brown, of the Victorian Agricultural Department, calls it *Argas Americanus*, or the Mexican poultry tick. Poultry are much troubled with tick in India, and as numerous birds have come to this colony from that country, no doubt tick came in the coops, &c. Victorians are fearful that the pest may make its appearance among their birds, and their Minister of Agriculture made regulations *re* birds from this colony. Ticks are to be found in many localities in the North, and the city and suburbs swarm with them. As regards the south and south-eastern portions, I believe they are free. My advice

is that whenever a strange bird is introduced it should be subjected to a week or ten days' quarantine, during which time frequent and careful examination should be made, not only for tick and other vermin, but also for signs of disease. I recently examined a dozen or so birds infested with tick, and subsequently found their roosting-house full of them. When short of prey the tick is flattish and often attenuated, but after a visit to a fowl it swells out with blood. They vary in size from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. in length. They are oval in shape, and of a plum color, varying in shade. Small ticks are found over the bodies of some birds, but only under the wings and on the inside of the thigh of others. At first sight they appear to be buried under the skin, but they are not so. They adhere with great tenacity to the skin and insert their proboscis beneath it, and very soon begin to swell out. They may be detached, and it will then be seen that they are identical with those found in cracks in the woodwork of the house.

It is an easier matter to destroy ticks in the wood than to kill them on the bird. Firstly, all woodwork should be removed and saturated with kerosene. My advice is to build all houses of iron only; the perches, if swung or framed on legs which stand in kerosene and water, may be of hardwood, planed and free from cracks. Such houses are easily kept free, for even in infested localities if the tick should effect a lodgment between the sheets where they overlap, they may be easily destroyed by removing the perches and then place an armful of grass, &c., saturated with kerosene, inside the house, close the entrance with a sheet of iron, and then fire the grass. The birds themselves should be dipped and held some minutes in a strong solution of phenyle, Quibbel's compound, Whalley's disinfectant, or Cooper's sheep dip. As a rule these are effective agents in the destruction of tick. If plain kerosene is used it will take the skin off the birds, but if mixed with an equal proportion of oil it is effective and destructive. Trees soon become infested. Ticks have repeatedly been found in the woodwork of poultry-houses which have not been tenanted by fowls for several years. It is not sufficient to merely provide perches on to which the ticks cannot get; they will creep along the roof of the house and drop on the sleeping birds; therefore the house must be cleansed frequently. With regard to dipping birds, if the weather is cold they must afterwards be dried in a room, on straw, before a medium fire. Ticks are not much in evidence in cold weather. The following recently appeared in the *Australasian* :—

Dr. Brown, Department Agriculture, tells us that poultry ticks (*Argas Americanus*) are strongly resistant to chemical agents. Strong solutions of perchloride of mercury and of arsenic fail to kill them, although the ticks are immersed in the solutions. Oils cannot alone be relied on. A mixture of two parts oil and four parts of a one-in-ten caustic potash solution kills them. Absolute alcohol fails to kill them. Strong ammonia in time kills them. A strong kerosene and soap emulsion also kills them. A mixture of two parts oil, four parts of one-in-ten caustic potash solution, and six parts kerosene, makes a most effective dip for fowls. As a matter of fact, when fowl ticks appear, there is no other course open but to pull down wooden fowlhouses, and erect iron ones, capable of being dismantled from time to time, and washed with solutions of lime and sulphur. The ticks are nocturnal in habit, and therefore are not seen about by day, but by night they issue forth from their hiding places in myriads, and get on to the fowls, and suck their blood, and produce anæmia and death. The most radical measures must be adopted to get rid of this pest. All places in which they harbor should, where practicable, be burnt, but where this is impracticable all crevices should be cemented up and coated with tar. They hide sometimes under the bark of trees, and such should be uprooted and burnt. Unless at night, ticks are seldom found on fowls, and fowls may be often enough found dead without any obvious cause. An examination of the fowl-house at night will reveal the cause. Sometimes, however, the ticks hide by day under the thighs and legs of one or two of the fowls in the yard, and these should then be dipped.

As regards the tick seldom remaining on the birds, I have seen hundreds of cases where dozens of fowls were to be seen almost too weak to walk and smothered with tick.

Where crevices have to be dealt with a syringe to apply the kerosene will be an advantage.

FARM NOTES.

By W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,
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The Standard Sample of Wheat.

The discussion provoked by the fixing of the standard weight of the wheat in the colony for each year is perennial. It is essential to the business of the wheat merchant to have some basis for quotations in Mark Lane or other market where he may propose to offer his wheat, but to the local miller, who can buy each parcel on its merits, it should matter nothing what the standard weight may be fixed at. That it does affect his transactions arises, I think, in this way. He cannot readily do business on the quality of the wheat offered to him, apart from the fixed standard, for immediately on his offering a higher price per bushel for wheat, say of a quality up to 67lbs. per bushel, all his customers who may have wheat to offer which is up to standard weight, and may rule between that and the 67lb. quality, hold out for the same price, and are dissatisfied if he differentiates the samples and offers accordingly. He also, therefore, is forced back on the standard sample of the exporter. I know that this is a question which only those *au fait* with the corn trade can understand in all its relations, and I do not forget that "He that passeth by and meddleth in the strife not belonging to him is like one that taketh a dog by the ear," but as it directly concerns in its results all who have wheat to sell it becomes a grower's question as well as the merchant's, and while the position continues unsatisfactory, and is capable of improvement, it cannot readily be too much discussed. It is in this relation that these notions are offered.

That the practice at present obtaining is unsatisfactory can readily be demonstrated.

1. The standard is generally fixed so low that good farmers suffer. I have heard many farmers express surprise and disgust (I think with justification) when shown the standard sample going out as representative of the colony's wheat. I have not seen this year's sample, but I know that in past years it has certainly contained a percentage of rubbish—drake, wild oats, chaff scales, shrivelled grain, broken grain—which should not have been there, and also other impurities, such as barley, small pellets of stone, particles of earth and sheepweed, more difficult to take out. It cannot be expected that wheat for the market should be cleaned so carefully, as, for example, seed wheat, but between this cleaning and that of the Chamber of Commerce sample there is a wide difference, and I know that a large proportion of our farmers would be ashamed to see such a sample leave their farms. If wheat merchants in Mark Lane pay attention to this standard sample it must affect disadvantageously the reputation of our wheat. While, however, our wheat is ungraded and sold on one sample only merchants have no alternative but to blend samples of that degree of quality only just marketable with samples of the finest quality, and the resultant mixture works out to be a sad advertisement for our farm management, while our wheat has lower value in the world's markets relative to that of other countries than should prevail, and our price here is affected accordingly.

As prices for qualities exceeding standard sample in weight are not higher than for standard quality simply, it becomes a mistake for farmers to clean their wheat well, and the result is that few men put their grain through the winnower a second time. A man might clean his wheat up to 66lbs or 67lbs. if he was likely to receive a higher price accordingly, and would feed the light shrivelled

grain and siftings on his farm, but if he does this he will have fewer bushels to offer, and, being unable to obtain the higher price, he is better advised to let rubbish enough remain in his sample to lower it to standard weight and sell more, such as it is. This, surely, is a handicap on good farming, and certainly reflects on the sample of our wheat.

2. Wheat is grown in South Australia over a wide range of latitude, and the average samples of the North, Middle North, South, and South-East may differ very appreciably according to the season. In any one year the Northern areas may be free from rust, and the farmers there have a well-filled, heavy sample to offer, while their fellows further South may find their sample more or less rust-shrivelled, while in another year the wheat in the North may be drought-shrivelled or blighted, while the sample from the South is exceptionally good. Accordingly the farmers in the fortunate district for any year suffer, in that, though the standard is fixed on marketable samples, the average is lowered by the inclusion of samples just on the marketable line from the suffering district. If, therefore, our wheat was graded and traded accordingly the farmers in the district fortunate would be credited with higher prices, while those with shrivelled samples to offer would also be in a better position, in that their samples would be up to the second grade or third grade if such graduation was possible, and they would have a definite basis to work instead of being exposed to irregular docking of samples, uncontrolled by definite understanding. It may be argued that this would entail more expense in sampling, and no doubt it would, but not so much as might be anticipated, I think, for well-cleaned wheat to be shipped at any one of the chief ports would be found very constant. The difference in weights from the same district arises largely from degrees of preparation for market.

3. The present practice plays into the hands of the local millers if they think fit to take advantage of it. No doubt they would prefer to have the standard higher; and I know that at least one firm tried to encourage thorough cleaning by quoting higher prices for good samples, but I believe had to fall back on the prevailing arrangement from reasons stated above. As things are local millers can select the finest samples at prices practically the same as are offered by exporters for the standard sample. It helps the exporter little to be able to gather the bulk of a shipment of a quality up to 64lbs. if he has sold the shipment on the sample of 62lbs., but it makes an appreciable difference to the local miller. Let me instance. The standard sample this year we will suppose to be 62lbs. I had a sample of wheat a week ago from the Caltowie district up to 68lbs. per bushel, and there may be more of it of that weight, or at least better than 62lbs. or 63lbs., as the case may be. If the farmer offers this wheat for sale he might with luck get a quotation 1d. per bushel better than market price for standard sample, but the chances are that his wheat would go at market price simply—the exporter's price. A bushel (60lbs.) of this wheat, averaging 5lbs. over standard weight, would yield from 5lbs. to 6lbs. more flour than similar wheat of standard sample, and would therefore return from 3d. to 4d. worth of more flour to the miller with flour at present rates. Such wheat is thus practically docked 2d. when bought at even 1d. per bushel over prices for standard sample. If he declines to pay market rates for wheat a little under standard weight, he should be prepared to pay proportionally higher for wheat over standard weight.

Again, there is room for question on another aspect of the matter. If this standard sample of 62lbs. or 63lbs. is the average of our marketable wheat, why should it be made the minimum? Will the average of the cargo bought on this minimum not be higher? In this case the buyer of the cargo in London will gain the advantage, for he will have bought on the standard sample basis. If the cargoes as collected here are only up to or a shade over standard sample,

then docked wheat, when the sample is taken as the minimum, must be included in them, and docked wheat will be quitted at full price. The whole arrangement seems unsatisfactory for merchant and grower alike.

I am writing without a full knowledge of the trade, and in that attitude are these questions advanced and suggestions offered. But of this I have no doubt, that the sample as it has been fixed for some years past is too low for the average farmer. I cannot understand why farmers should complain that it is too high. As a grower of wheat I can confidently say that I would have preferred to see the standard made higher, by making the minimum weight to be admitted into the bulk from which the average is taken higher. In the discussion of the matter by the members of the Petersburg Agricultural Bureau, as published last month, the Chairman and Secretary, in my opinion, took the desirable view of the matter. However, I cannot see how the fixing of one standard sample for the whole colony can ever give satisfaction. It will always affect injuriously the districts where the samples are finest and, under present arrangement or present practice, benefit nothing those farmers where the sample is lighter. If three grades could be adopted, say 65lbs., 62½lbs., and 60lbs., and accepted as Nos. 1, 2, and 3, respectively, and these maintained from year to year without variation, the difficulty would be overcome; but for the small quantity of wheat which we have to offer this would be a graduation too complex. I would suggest, however, for consideration by Bureaus, farmers, and merchants alike that an effort should be made to grade our wheat into two samples, viz., No. 1, 65lbs. per bushel, and No. 2, 61lbs. per bushel. I believe we could as farmers arrange to have our samples up to these minima without the introduction of elaborate grading machinery. The attachment to the winnower of a small revolving grading screen would be sufficient, and, indeed, in most cases the result could be obtained with our ordinary machinery. I would suggest further that these minimum weights, or others which the experience of the growers and merchants of the colony may favor, be adopted as constants. I will say again that I trust the voices of those who cry for a lower standard will be smothered, and the voices of those who advocate higher levels strengthened.

The Farmers' Union has here a good opportunity for useful work.

BUNT AND SMUT.

At this time of the year there are a great many inquiries made with respect to these distinct kinds of parasitic fungi, and if those who are not well acquainted with the subject will carefully note the following facts it will save correspondence, and possibly enable them to prevent losses in next season's work.

Bunt, often miscalled "ball smut" or "stinking smut," is a parasitic fungus known to botanists as *Tilletia Triticæ*, or formerly as *Tilletia caries*. Smut, otherwise "loose smut," is another genus of microscopic parasitic fungi, known to botanists by the name of *Ustilago segetum*. If the seeds or spores of these parasitic plants are examined under a powerful microscope they will be found to differ considerably in form and appearance. They also differ in character and in method of reproduction, although both forms begin their attack upon the cereal plant at its earliest stage of existence, grow up within the body or tissues of the plant, and complete their existence by taking possession of the material provided by the cereal for maturation of wheat, barley, oats, &c., and producing instead bunt balls or loose smut respectively.

The "loose smut" (*Ustilago segetum*) more often attacks oats and barley than wheat, and the myriad of spores from each grain or glume of oats or

barley becomes scattered all over the field long before the crop is harvested. These spores drop to the ground, and lie there waiting the production of young grasses, oats, barley, and other cereals. But if such grasses, &c., should not appear, the spores would most probably germinate under the influence of spring weather and sufficient moisture, and, finding no plants to live upon parasitically, the "loose smut" plants would die of sheer starvation because they possess no roots, and cannot live except upon the sap of cereal plants. Because the spores are scattered before the grain is harvested it is evident that pickling would be of little use in preventing the occurrence of "loose smut" in a cereal crop; but fallow or the cultivation of plants unsuitable to its requirements would probably exterminate it for a time in a field intended to be cropped later on with cereals.

Bunt (or "ball smut," as it is wrongly called), or properly *Tilletia Triticis*, more commonly attacks wheat plants than other cereals. Each ball of bunt contains hundreds of thousands of seeds or spores, each spore capable of producing a microscopic plant, pervading sometimes the whole of a wheat plant, but often only one or two of the stems, and occasionally only one side of a stem and fruiting or producing bunt only on one side of an ear. When the bunt-plant is mature or ripe it has produced its seeds or spores within the skin or bran of what should have been a grain of wheat; but the bunt plant which produced that "bunt ball" extends from the roots of the wheat plant right up to its ear. When the wheat crop is thrashed the tough skin of the bunt ball gets broken, or if it escapes being broken at that time it will probably become broken when being sown with the seed sower or otherwise. Each ball contains sufficient spores, if thoroughly distributed, to infect every grain in a bag of seed wheat, and each grain of wheat so infected may produce a bunted plant. When the wheat is sown without being first pickled on dry soil it is very possible that the bunt spores or seeds will germinate and grow themselves to death before the wheat grains can find sufficient moisture to enable them to start growing. The bunt plant must have a cereal plant to live upon, because it has no roots or leaves of its own to supply it with nutriment. The spore is smaller than the smallest dot that can be made with a pen, or the most minute mark that can be made with the point of a needle; but even this spore can start a kind of rootlet when it is moistened, and this rootlet is too thick to find an entrance into the young shoot from the wheat grain; therefore the bunt rootlet produces branches of even a finer nature, and one or more of these branches find their way through the pores in the skin of the first shoot from the grain of wheat, and from thence onwards to the maturity of the wheat plant it continues to produce mycellium or rootlets within the stems of the wheat plant—sometimes only on one side, but generally all over—until at last the wheat plant begins to provide material for the formation of its own seeds; then the bunt plant takes possession of that material, also of the outer envelope intended to be a grain of wheat, and produces within that envelope a myriad of bunt-spores, the whole forming what is called ball smut. If bunted wheat is sown during wet weather or upon damp soil the bunt spores and wheat grains will start growing at once and the wheat plants are certain to be bunted. Under no circumstances is it safe to sow wheat without pickling; but if the seed is very free from bunt, and if the soil is dry and the time of sowing is early, the probabilities of a bunted crop are lessened. The most effectual way to pickle wheat is to throw the grain into a pickle made with an ounce of bluestone for each bushel of grain, and just a little more water than will be absorbed by the grain; then stir or shake the grain so that it shall be effectually wetted with the pickle; drain off the surplus liquor, put into pickled or else new bags, and be careful that the sowing-machine or drill is perfectly clean and free from bunt spores. In pickling a basket could be used, and when the grain is immersed and well stirred the bunt balls (if any) will probably rise to the surface, and should be removed and burned.

THE VINEYARD.

SEASONABLE NOTES.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The rain that in its impartiality falls alike on the just and the unjust meets at all times with welcomes that vary considerably in their cordiality, according to the sources whence they proceed, and, much as some pastoralists may see reason to grumble, the vine-growing fraternity cannot but rejoice over the opportuneness of the general rains that visited us in January. A succession of hailstorms, welcomed by nobody I hope, have in most districts unfortunately done much towards thinning out our crop; what is left, however, holds out every promise of reaching the cellars in the most perfect of conditions. It has rarely been my lot to see fruit fill out better, and this is the case even in our drier localities. As a matter of fact, a cursory review of the season will readily show that, if we except the hail, vinegrowers can have no quarrel with 1898-9 weather. The unusual heaviness of the winter rainfall is undeniable, and wherever the principles of rational cultivation are respected the vines were enabled to lay up a store of moisture sufficient to tide them over the spring and early summer drought; in this way they were undoubtedly aided by the low temperature that prevailed in November and January. And just as the somewhat protracted drought was beginning to tell, if not on the plants themselves at all events on the fruit, come falls of rain equal in their steadiness and thoroughness to the best of winter rains. Were it not for the ubiquitous hail, of unfortunate memory, in spite of the unfavorableness of past seasons, a vintage considerably above the average might fairly have been anticipated. As things stand, however, it is more than probable that this year's returns will show a considerable shortage on the 1897-8 vintage. Such a deficiency, however, need not necessarily be looked upon as an unmixed evil; the setting of the fruit was in many cases exceptionally good, and it may be questioned whether the maturing of a heavy crop would not have overtaxed the strength of vines that were, so to speak, still in the throes of a three years' drought. In addition to this we may lay the flattering unction to our grumbling souls that, relatively small though the vintage may be, it is of first-class material that the '99 wines will be made. The quality of a wine is largely dependent on that of the fruit, and the latter is at the mercy of the caprice of external conditions. Excessive summer heat, inducing sudden and rapid development and ripening, followed on by more or less partial withering, is the thorn in the flesh of South Australian growers. From such an evil during the past season we have been singularly free; relatively low mean summer temperature, aided at the most opportune of times by providential rains, has permitted the fruit to ripen slowly and gradually, in a manner truly reminiscent of the homes of the world's most celebrated wines. Given careful manufacture and good treatment, we may look for good wines from the last last year of the century.

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The very satisfactory manner in which in almost every instance our vines have weathered the three years' drought, that we are now happily fast leaving behind us, serves only to bring out in still more marked relief their undoubted adaptability to our climate. In this respect, struggling on successfully as they have done, even in the most unfavorable of localities, whilst fruit trees in their immediate neighborhood were dying out in scores, their superior hardiness over that of the latter has been amply proved. It would, however, be idle to argue that they have come out scathless from the conflict; without doubt, in spite of a favorable winter, to an experienced eye to-day the most striking feature in

our vineyards is in general a marked reduction in the vigor of growth of the plants. Fortunately this general weakness is far from being an evil that is beyond remedy; in fact, given a succession of good wet seasons, of itself it will disappear; those, however, who are willing to lend a helping hand to nature and their own interests will anticipate this event by heavily manuring their vines during the coming season. Such an eventuality immediately gives rise to a question on which I do not feel at present inclined to dwell, reserving it for a future and more seasonable moment; here I wish merely to draw attention to the relative hardness of some of our most commonly cultivated varieties. As the best drought-resisting vine that we possess I would certainly place at the head of the list, and in a class by itself, the Spanish Doradillo; like the proverbial cat it has nine lives, and nothing seems to check its vigor of growth or its general fruitfulness. Next in order of merit I would class Mataro, Cabernet Sauvignon, Grenache, Carignan, and Malbeck, all of them fairly hardy vines; and then in a class of its own we have Shiraz, the weakest of the lot. After their three years' trials, to-day it is only in the most favored of spots that Shiraz vines present anything like an encouraging appearance; and this is all the more regrettable in that from other considerations it is probably the most serviceable all-round grape that we possess, and has in consequence been very largely planted over our vine area. But even of this variety there is no reason to despair. True, one or two good seasons may not prove sufficient to restore the older vines to their pristine vigor, but good and intelligent treatment, leavened with a little patience, will in the long run ensure their complete rejuvenescence. And, after all, does not the fact that so delicate a vine should have lived to tell the tale of its sufferings through three successive years of unparalleled dryness tend to prove that its value has not been over-estimated.

In my January notes I hazarded the opinion that in all probability the '99 vintage would be later than the one immediately preceding it. The late rains and remarkable coolness of the past month have certainly lent a helping hand to my prophetic views. Nevertheless, in many of our earlier districts February will witness the opening of the campaign. A few words on the vintage should not, therefore, prove out of place. There is probably no truism that is more often repeated, or with which winemakers are confessedly more familiar, than the fact that the manufacture of good sound wines is largely dependent on the most scrupulous cleanliness; and yet there is no principle, in my opinion, that is more persistently, though possibly often unintentionally, violated in the majority of South Australian cellars. It is often a modern version of the whitened sepulchres. To the general observer what is visible is frequently, though not always, scrupulously clean, but the internal details, had they utterance, would in many cases tell a different tale; and, after all, such cleanliness as wine-making demands does it not interest the inside rather than the outside of the cup and platter?

Is it necessary to dwell on the facts that render attention to the minutest of details in such a question absolutely necessary if wine-making is to be something more than a game of hazard. I had not thought so some years back. Of late, however, I have, on various occasions, been brought in contact with glaring instances of neglect that want of knowledge alone could palliate or explain. I offer, therefore, no apology for the details that are to follow:—That the transformation of grape juice into wine is brought about by the agency of minute living organisms is known to every maker, and, further, that these organisms, in spite of their vast numbers and prodigiously rapid prolificness, have frequently to struggle for full possession of the medium in which their lot may be cast

against obnoxious intruders, comes also within the ken of most up-to-date wine-makers. It is against these intruders, that lurk in the cracks and crannies of cellars, casks, shoots, pumps, &c., that the winemaker should wage perpetual warfare. True, we introduce them in large numbers into our vats on the skins and stalks of grapes; true, that at certain seasons of the year the atmosphere is laden with their germs; but does this argue, in consequence, that we should, by neglecting the details of cleanliness, prepare for them within the precincts of our cellars comfortable resting-places? The danger to the must in fermentation is not our only consideration. Given that the yeast is surrounded by conditions favorable to its development, the very vigor of its growth is generally sufficient to crowd out other more slowly developing germs. Unfortunately it does not raise a perpetual bulwark against any future invasion of the latter. The wine itself, that originally resulted from the decomposition of grape juice, is in its turn subject to still further decomposition at the hands of germs whose triumphant career is no more held in check by the yeast cells. Again, both grape juice and wine, like milk, by-the-by, are both eminently liable to absorb and firmly retain strong odors of any sort. It may therefore be noted *en passant* that the fusty smell of our cellars, or the malodorous wagons that deliver the vintage, are in nowise calculated to enhance the quality of the wine.

On the absolute necessity of scrupulous cleanliness I can say nothing more, and, it appears to me, nothing stronger. Let us now examine some of the ordinary instances in which this virtue, second only to godliness, is most frequently allowed to stand in abeyance. And first I must have my annual tilt against German wagons, covered with dirty tarpaulins, for conveying the vintage to the cellars. I am perfectly well aware of all the arguments that can be urged in their favor. When grapes have to be conveyed over long distances it is undoubtedly far cheaper to throw them *pêle-mêle* between the frames of open wagons than to have for their reception smaller receptacles piled one above the other; loading and unloading are also considerably simplified. To my mind, however, when the contingent ill effects on the wine are taken into consideration, such arguments carry no weight whatsoever. Is it worth while spoiling the ship for a ha'p'worth of tar, or is the additional expense so very great as to interfere with the profits of the business? Disguise it as we may, these wagons—loaded now with stable manure, now with pigs or anything else equally objectionable—are not fit to convey the raw material destined to be converted into a beverage for human beings; and, in addition to the purely ethical objection, such a practice, as has already been stated, endangers the future of the wine. To state that such conveyances can readily be cleaned and put in fit condition to receive the vintage savors of ludicrousness if not of absurdity. Every board would have to be taken off and planed, every crevice obliterated, before such would be the case; and who are they who as much as scrub down their wagons with soda and boiling water? And yet the difficulty might readily be overcome at relatively little cost. In small cellars surrounded by the vineyards that feed them the practice that I saw applied in some Victorian cellars might readily be adopted, viz., having a sufficient number of kerosene tins to stack the drays or wagons and keep the pickers going. In larger cellars, or where the distance of conveyance is greater, specially-built adjustable frames might be fitted on to the wagons for the exclusive use of the vintage; once this operation is completed they could be removed, cleaned up, and put away for the year.

Needless to say that in the cellar everything that is destined to come in contact with the fermented or unfermented liquid should be most carefully prepared and scrupulously cleaned. And here we owe a debt of gratitude to Mr. B. Seppelt, of Seppeltsfeld, who I believe was the first to indicate a very simple method for keeping the wood work of cellar plant in good working

order. I refer of course to the use of a parafine wax. A coat of this substance spread uniformly over the wood work of presses, crushers, elevators, &c., gives it a perfectly smooth surface, that effectively belies any excuse for imperfect cleaning; in addition to this it renders the wood more or less impermeable, thus readily checking its saturation by fermentable liquids with its concomitant complications. The walls of cement fermenting tanks should be carefully scrubbed; pumps, tubs, hosing, all should be properly attended to, both before and during the course of the vintage. To Mr. Seppelt we are again indebted for a very simple expedient for keeping a cellar clean during the vintage time. Any beginner soon becomes aware of the practical impossibility during this time of the year of avoiding spilling from time to time on the floors of the best-regulated cellars a certain amount of must or wine. These pools of fermentable matter are extremely dangerous to the well-being of the neighboring wines; they rapidly become the breeding grounds of disease germs that are readily wafted where they are least wanted. It goes without saying that, during the vintage time at least, the floors of a cellar cannot be scrubbed and treated like those of a dwelling-house, and, as Mr. Seppelt very justly points out, to clean them up in a half-hearted sort of way with a little water only makes things worse, by diluting the liquids and rendering them more liable to fermentation and putrefaction. The whole difficulty may be overcome by a liberal use of burnt gypsum or plaster of Paris wherever any liquid has been spilt. This substance, owing to its high hygroscopicity, absorbs the liquid, and whenever necessary may be swept away, leaving the floor sweet and clean. After some experience of its advantages, my advice is not to spare it, but to make a full and abundant use of it.

And yet another point that has reference to cleanliness in wine-making. If the absolute cleanliness of fermenting vessels is a matter of necessity, how much more so may it be said of those vessels destined to receive the new and defenceless wine? The warning against the use of old bottles for new wines has not lost its significance for us. True, in modern eyes, old seasoned casks are more estimable than new ones, but before they receive new wine they should be so cleaned and prepared as to be new in every other acceptation of the term. The tartar, beneath which disease germs so frequently lurk in peaceful security, should always be carefully scraped off, the wood thoroughly scrubbed, and the cask freed from any taint or objectionable odor. Very particular attention should be paid to casks having previously contained wine that had gone wrong. No other wine should be allowed to go into them until they have been thoroughly cleaned, and subsequently sterilised with steam. There is an unfortunate popular heresy that seems to have a hold on some makers, to the effect that a bad cask may be restored by using it for a season as a fermenting vessel. This may or may not be the case, but, if it is so, it will certainly be at the expense of the wines that are made in it. If we value our reputations as winemakers let us abjure all such heresies.

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A few other hints of a seasonable character may be thrown out for the benefit of those who are not yet thoroughly conversant with wine-making operations. Remember that where large areas are to be harvested it is as well to slightly forestall the perfect maturity of the fruit, for fear of having on one's hands at the end of the season a superabundance of over-ripe grapes. Note that in most cases light wines are best made from slightly unripe grapes, and sweet wines from over-ripe fruit. Make up your mind beforehand as to what kind of wine you intend making, and do not make your sweet wines from dry wines that have gone wrong. In general the density of musts of dry wines should not exceed

1100, and the nearer 1090 the better. Be sparing in the use of spirit, and only use it for sweet wines. It is the stand-by of the careless maker. Keep fermentations steady and even, and do not let temperatures get much above 90° F. Use the coolers freely if you have any. If you have none, avoid putting in fermentation over-ripe grapes at too high a temperature. Keep a carefully-written account of every fermentation for future reference in case of necessity.

WEATHER AND CROP REPORTS.

BALAKLAVA.—The weather for this month has been remarkably cool, with strong south-west winds at times, and those having sandy land following have got it blown about, making some of the roads almost impassable. The harvest is finished, and the crops generally have turned out better than was expected; the average for this district should be somewhere about 8bush., some of the drilled and manured crops going up to 17bush. and 18bush. per acre. The fruit in this district, with the exception perhaps of grapes, is a comparative failure, owing to the frost and rough weather.

CHERRY GARDENS.—The first part of the month was dry and hot, but since it has been cool and showery, improving the vegetables and fodder crops. The fruit crops have, however, been considerably damaged by the heavy winds, and those with low-pruned trees have reaped the benefit this season.

CRYSTAL BROOK.—The harvest is at an end, the results falling far short of the promise of the early part of the season. As much as 1 bush. per acre has been reached from fallow land, and only 2bush. to 8bush. from old land. The grain in some cases is not up to standard; the average for the district is about 7bush. The high winds have done much damage to the fruit crop. Grapes are fairly good. Sorghum has failed, except where well watered. Rainfall for year 1898, 12.63in.

GAWLER RIVER.—Unseasonable weather has prevailed of late, and the strong winds are causing fallows to drift where this trouble has never before been experienced. The sand in some cases almost block the roads. Stock remain in fair condition, but feed is short, and would be spoilt by much rain just now. Harvesting is finished with satisfactory yields; wheat, about 12bush. and a good sample; hay, 25cwt. per acre. The hailstorms in November did much damage to the fruit crop, and the heavy winds this past month have blown a lot of fruit off the trees.

LUCINDALE.—The weather during the early part of the month was too cool to allow of stripping being finished. Rain commenced on the 18th, and in four days over 2in. fell; this may permanently injure the crops still standing. Stock are in excellent condition. Fruit crops generally very light.

KAPUNDA.—Rainfall for 1898, 20.28in. Farmers are busy carting wheat, chaff, and straw.

MEADOWS.—The pea crops drilled in yielded 30bush. per acre, wheat up to 40bush., and hay also very good. The fruit crop is fairly good, but somewhat injured by the hailstorms. Stock in good condition.

MINLATON.—Farmers here are generally satisfied with the yield, the cleaning up in most cases being better than expected. The sample is exceptionally good. Steinwedel wheat did exceptionally well, and good returns were obtained from Dart's Imperial. Hawke's Club Head promises to come into prominence on account of its yielding qualities. Underground grubs did considerable damage, and would have been worse but for the vigilance of crows, magpies, plovers, and other insectivorous birds. Dry feed is abundant, and where properly looked after mangolds and sorghum are making growth. Sheep and cattle are fat, but many of the latter are dying from some unknown cause.

MORPHETT VALE.—The grape crop has been greatly helped by the rains during this month, and now the vintage promises to be equal if not better than last year, but below the 1897 vintage. Wheat crops have done well, and the district will probably average 10bush. Hay has varied from half a ton up to 3 tons 6cwt. per acre on one farm of 150 acres.

MURRAY BRIDGE.—The weather has generally been cool, with rainfall of $\frac{1}{2}$ in. per month. Harvesting operations are finished and the results have been satisfactory where manure has been used, but rather disappointing from unmanured old land. Stock in good condition, but are beginning to suffer from impaction.

MYLOR.—The rain this month has made the crops look up, but the fruit is very light and, owing to hailstorms, is of inferior quality.

PORT ELLIOT.—Harvesting operations are about over, and farmers appear to be fairly satisfied with the yield, but not with prices. One farmer reports having got 64bush. of oats from one acre, and another had 127 bags of peas from sixteen acres. Plums and pears are up to if not better than the average, but apples are very light.

PTAF.—Harvesting operations are at an end, with very good returns. A great amount of damage has been done to the crops by parrots, cockatoos, and starlings. Stock are doing well, and the weather is mild and favorable to growth of summer crops.

SADDLEWORTH.—The wheat harvest in this district has been good, and from four to five bags per acre of good grain been reaped. The spring weather was unfavorable for sorghum, which failed to get a good start. No great quantity of hay cut. Stock in good condition. Weather cool and pleasant.

WOODSIDE.—The weather for some time past has been unfavorable for harvesting operations, and a good deal of wheat still remains to be reaped. Returns are very satisfactory, many crops averaging from 16bush. to 20bush.; hay from 30cwt. to 2 tons per acre.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

February 1, 1899.

This summer is, like its predecessor, evidently a record-making one, the month just closed being the coolest January yet recorded in Adelaide, and appearances point to the probability of this proving the most temperate summer experienced, as against the previous one for extreme heat. Nice light rains, although somewhat partial in character, have fallen, and supplies of water and feed are fairly plentiful throughout the pastoral and agricultural districts.

Trade generally has been satisfactory, in spite of the low value of our staple product, wheat.

Shippers of wheat have evidently a strong belief in supplies readily available, as we learn that sales have been made freely, and charters effected for January-February, and quantities coming forward apparently justify their attitude. The European market became a shade stronger when unfavorable weather conditions in the Argentine practically reduced their estimated exportable surplus by one-half. Reports from India, however, on the other hand, point to the likelihood of a good harvest there, so that no immediate prospect appears of any advance in price, though it is felt that speculators in the United States hold the key of the position, and by a combination at any moment might materially enhance values. In flour the market is somewhat weak, intercolonial business being dull and only a very moderate South African trade possible from this port, the establishment of a line of steamers from Melbourne to Capetown giving our neighbors a decided advantage in export to that part of the empire. In offal lines the market is at moment decidedly strong, though hardly likely to maintain at rates relatively higher than ruling in the adjoining wheat-growing colonies. In spite of the fact that it has been cool on the coast many portions of the interior have been experiencing extreme spells of heat, scorching up feed, so that there is an increasing demand for forage towards the inland districts.

Mount Gambier potato-growers, anxious to participate in the long prices ruling at the beginning of the year, rushed forward supplies—some in rather unripe condition—a bit hurriedly, so that prices fell away considerably, but during the past week have somewhat steadied. The local crop is being used up, and in a very few weeks the market will be dependent chiefly on South-Eastern supplies. The out-turn in that district, especially of the late crop, is likely to be fair, but as dealers in the line figure out a shortage compared with the season's consumption, values should maintain. Locally-grown onions have kept the market well supplied, and the South-Eastern crop, in spite of the early disasters experienced, is likely to bag out fairly well.

The month's business in most dairy lines proved rather unsatisfactory. The unseasonable character of the weather has enabled small dairies to continue butter-making later than usual; but quality suffered, so that for the past two or three weeks there has been an undue proportion of low-grade stuff offering. The advance in price during December caused exportation to cease, but the past month has still seen a small surplus weekly, which has mostly gone into cold chambers on owners' account. The cool weather is also responsible for a very material diminution in the consumption of cheese, and, along with the anxiety of some holders, has caused this line to touch lower prices than at any time for several years past, but is having the effect of stimulating demand to some extent, and, as stocks are not abnormally heavy, a healthier tone may be expected to prevail as the season advances. Good business has been done in bacon, price showing a slight improvement during the month, supply being equal to demand. The abnormal condition of the egg market when last we wrote did not long continue, values steadily advancing to the extent of 4d. per dozen during the month; slight reaction has been apparent, however, within the last few days, but active demand from West Australia is likely to prevent any serious reduction. Honey has been selling freely, and values firmed up, but are again easing, and this line should attract speculative buyers surely at present price. Seasonable trade demand doing in almonds. The demand for poultry fell away after the holidays, supplies also decreasing, and values rapidly declined until they are now about 30 per cent. lower than prior to Christmas time.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, new, 2s. 6½d.; outports, 2s. 5d. to 2s. 6d. per bushel of 60lbs.
 Flour.—City brands, £6 10s.; country, £6 5s. per ton of 2,000lbs.
 Bran.—8d.; pollard, 8½d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 4d. to 1s. 6d.; stout white, 2s. to 2s. 6d. per bushel of 40lbs.
 Barley.—Malting, 3s. 6d. to 4s.; Cape, 1s. 8d. to 2s. per bushel of 50lbs.
 Chaff.—£2 10s. to £2 15s. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—New local, £3 10s.; Mount Gambiers, £3 15s. to £3 17s. 6d. per 2,240lbs.
 Onions.—£4 10s. per 2,240lbs.
 Butter.—Creamery and factory prints, 9½d. to 11d.; dairy and collectors' lines, 7d. to 9d. per pound.
 Cheese.—S.A. Factory, large to loaf, 4½d. to 6½d. per pound.
 Bacon.—Factory-cured sides, 7½d. to 7¾d.; farm lots, 6d. to 7d. per pound.
 Hams.—S.A. factory, 7½d. to 9d. per pound.
 Eggs.—Loose, 9½d.; in casks, f.o.b., 11d. per dozen.
 Lard.—In bladders, 5½d.; tins, 4d. per pound.
 Honey.—2d. to 2½d. for best extracted, in 60lb. tins; beeswax, 1s. 1d. per pound.
 Almonds.—Soft shells, 3¾d.; kernels, 11d. per pound.
 Gum.—Best clear wattle, 2½d. per pound.
 Poultry.—Medium to good roosters, 11d. to 1s. 6d. each; hens, 1s. to 1s. 3d.; chickens, 8d. to 1s. 2d.; ducks, 1s. 3d. to 1s. 8d.; pigeons, 5½d.; geese, 2s. to 2s. 6d.; turkeys, 5d. to 7½d. per pound live weight.

DODDER IN LUCERN.—Before sowing lucern or clover seeds they should be very carefully sifted to take out the seeds of the parasitic dodder. If dodder should be found in any such crop mow the patches, *before the dodder seeds have formed* (this is most important), close to the ground, remove all that has been mown, then rake off with a fine-toothed rake every particle of dodder which may have remained attached to the stumps of the plants, and sprinkle the ground heavily with a solution of 1lb. of sulphate of iron per gallon of water. If the dodder seeds have been formed, mow the lucern or clover, cover the bare patches with straw, and burn it. The seeds of dodder will be destroyed, but the roots of lucern or clover will not be much injured.

SCAB IN SOUTH AFRICA.—Scab in sheep, goats, and animals of similar nature has been rampant in Cape Colony and adjacent country for a long time, and efforts made by the Government to deal with the evil have been most strenuously opposed by the more ignorant of the farmers and natives, even to threat of sudden death to the officers administering the law. It is satisfactory to learn that some districts have, nevertheless, become almost or quite freed from the disease, and that opposition is giving way before the practical demonstration of the effectiveness of the remedies adopted.

ENCOURAGEMENT OF HORSE-BREEDING IN AUSTRIA-HUNGARY.—The Governments of this empire pay great attention to the improvement of the horse stock of the country. With this purpose in view stud farms are kept up, covering stations fixed, and owners of pure-bred stallions subsidised. In Austria the sum of £170,300 was devoted to this purpose in 1897, and in Hungary £230,000 per annum was voted. In Austria there are two stud farms, the progeny being kept for breeding purposes; the stallions being sent to the stations, and the mares used either at the studs or sold at low prices, or even given free to the poorer peasants. There are 522 covering stations containing 1,763 stallions, 276 stallions in private hands, and ninety nine on hire to communities. The fee for service varies from 1s. 8d. up to 16s. 8d. All stallions, whether State owned or private, have to be passed by a veterinary and licensed. The use of an unlicensed stallion, except for the owner's mares, is a punishable offence, whether a fee is charged or not. In Hungary the system of State encouragement is very similar. There are four State studs, eighteen stallion depôts, 946 covering stations, with a total of 2,838 stallions.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, JANUARY 18, 1898.

Present—Mr F. E. H. W. Krichauff (Chairman), Sir Samuel Davenport, Hon. A. W. Sandford, Messrs. S. Goode, M. Holtze, J. Miller, M.P., T. Price, M.P., T. B. Robson, and A. Molineux (Secretary).

Standard Bushel.

The Secretary reported that, at latest meeting of Petersburg Branch, the subject of the fixing of the standard weight of the bushel of wheat for the present season was discussed, and a resolution carried that the various Branches should forward fair samples of the wheat of their respective districts, marketed early in the season, to the Central Bureau where they should be mixed thoroughly, measured and weighed, and the result communicated to the Chamber of Commerce, so that it might be taken into account when the standard for the season was fixed. The Secretary stated that he had already pointed out that the Central Bureau had no facilities for this work, and was not consulted in any way by the Chamber of Commerce on the matter.

Mr. SANDFORD said it was useless for the Central Bureau to endeavor to fix the standard in the way suggested, as the buyers and millers, being most concerned, would take no notice of the Bureau. They should first endeavor to get the Chamber of Commerce to admit the right of the producers to be consulted on the matter, and to take part in fixing the standard.

Mr. MILLER said the method adopted by the Chamber was not a fair one. They asked for samples of wheat purchased in the district without any deduction having been made by the purchaser, thus excluding all good milling wheat which was perhaps 1lb. or 2lbs. below previous year's standard. It was most unfair to exclude such samples, and really meant that the standard weight adopted by the Chamber was an average of the best quality, and the lower, but still good milling samples were judged by this so-called standard. Then the question of amount docked for wheat under the standard required to be settled. There should be some fixed rate proportionate to weight below standard. Some buyers would not buy any samples under weight. While he was anxious for a high standard for our wheat, there was no question that in many districts good milling samples were under 63lbs. to the bushel, and in some cases did not go 62lbs. He believed that, if approached by the Bureau, the Chamber of Commerce would meet the representatives of the producers fairly.

Mr. SANDFORD agreed with Mr. Miller that the producers should have some say in fixing the standard, and that it would be a good thing if they could get some definite arrangement with regard to "docking." He did not, however, agree that the standard bushel should be an average of the whole output of the colony. In many seasons there was much wheat absolutely useless for milling purposes, and it would be absurd to touch this in fixing the standard. They must remember that this standard was supposed to be a fair average of the wheat fit for export; in other words, it was the standard by which first-class milling wheat was bought and sold without the parties actually seeing it beforehand. It was absolutely necessary that a standard should be fixed, and that it should be a fair average of good milling wheat only.

After considerable discussion it was resolved to inform the Petersburg Branch that their suggestion was impracticable, and that the Secretary be instructed to communicate with the Chamber of Commerce with a view to the Central Bureau, as representatives of the producers, being represented on the corn trade section of the Chamber when the standard bushel of wheat for the coming season is fixed.

Donations.

Mr. R. Marshall, of Hope Farm, Templers, forwarded one bag of seed of Bartlett's Crossbred wheat and half a bushel of Indian King wheat for distribution amongst the Branches in districts where the past season's harvest has been a failure. They were both early and valuable varieties, and he thought that these wheats would give satisfactory results in the dryer districts.

A vote of thanks was accorded to Mr. Marshall for his valuable gift.

Sheep and Dogs.

Sir SAMUEL DAVENPORT called attention to notes in January *Journal*, by Professor Lowrie, on "Sheep for Farmers." He thoroughly agreed with the Professor. We consume large quantities of beef and mutton, the live stock being travelled for long distances, and the meat injured in consequence. Their mutton at least should be grown close to market, but the trouble caused by dogs prevented farmers in most of the closer settled districts from keeping sheep to the extent they would otherwise do. They had laws *re* registration of dogs, etc., but they were not properly enforced, hence the evil complained of.

Other members agreed that the complaint was justified, and it was decided to ask the Branches to consider the matter and suggest methods of overcoming it.

Extracts and Translations.

The CHAIRMAN read the following extracts and translations from Foreign Agronomical papers:—

271. *Cheese*.—It has been found that cracks and blisters in cheese are often caused by injurious bacteria in the water used with the rennet, and that the evil can be prevented by previously boiling the water.

272. *Diseases of Milk*.—Mr. A. Schenckel has conducted extensive laboratory researches into the diseases and changes occurring in milk under various conditions, such as thin and watery milk, slimy or ropy condition, putridity, blue, green, and red colors of milk, poisonous milk, frothy milk, cheesy and bitter milk, &c. These investigations are of great importance to science. Mr. Schenckel concludes that the remedy (or preventive, rather) is absolute cleanliness in everything connected with byres, dairies, utensils, machinery, the udders of the cows, the persons milking and treating the milk, and the supply of pure water and wholesome and nutritious food to the cows.

273. *Lime*.—The following shows the quantity of lime taken from an acre of land by a good crop:—

Wheat, barley, or oats	about 20lbs.
Potatoes or turnips	" 40lbs.
Peas, beans, or vetches	" 60lbs.
Clover	from 65lbs. to 120lbs.
Rape, hops, tobacco	" 120lbs. to 200lbs.
Lucern and sainfoin (esparsette)	" 160lbs. to 240lbs.

As the last are perennials, and remain a long time in the soil, they require absolutely large quantities of lime. It is injurious to apply lime directly to a crop of potatoes, as this would induce scurviness of the skin.

274. *Pure Ferments*.—The Experiment Station, Gratz, Austria, publishes the following items:—When the fermentation is too slow the bacteria producing acetic acid form a thin film on the surface of the must or wine, and convert a portion of the alcohol into acetic acid; and in a like manner the lactic acid bacteria change the sugar into lactic acid; or another bacterium may form slimy fermentation from the sugar, and thus prevent clarification; or a mould may appear on the surface in the form of a white wrinkled film if the casks are not kept well filled; but all these diseases of the must or wine can be prevented by a quick and regular fermentation. Pure cultures of ferments can now be purchased (in Europe) in small tubes. A few days before beginning the vintage from 5qts. to 10qts. of grape juice should be made, boil it and let it cool in the vessel closed with a lid. Then place it in a large fermenting bottle [just previously scalded with boiling water. The boiling and scalding of the must and vessel is done to kill all foreign ferment germs, but the liquor must be cooled before adding the pure ferment, else the heat would kill that also.] Take a tablespoonful of the boiled and cooled must and pour it into the tube of pure culture; then the contents of the tube are poured into the large fermenting bottle, but keeping back the surface or feeding scum by aid of a knitting needle. A single tube is sufficient to convert 5qts. to 10qts. of must into pure ferment,

and this again can be put into a 25qt. or 50qt. cask three parts filled with fresh pressed must, closed with a fermenting bung, and kept for five days to eight days in a strong ferment. Finally the now large quantity of pure ferment can be divided into 5qt. lots, each of which is sufficient to add to each 300qts. of new must.

275. *Alkali Salts and Gypsum.*—Later publications by the professors of the University of California and requests for information within this province make it desirable to make further extracts from the above. The alkali salts consist of three chief ingredients—common salt, glauber salt (sulphate of soda), and carbonate of soda. The first two constitute "white alkali," which is not quite so noxious to plant growth, and gypsum is of no benefit where only common salt and glauber salt is present. The carbonate of soda causes the "black alkali," which shows on the soil black spots or puddles from dissolving the humus in the soil, and destroys the tender crown roots of plants near the surface; it also compacts the land. Associated with the three before-mentioned salts are, however, in varying amounts, those useful plant foods, as sulphate of potash to the extent of 5 per cent. to 20 per cent. of the total salts, phosphate of soda from a fraction up to 4 per cent., and nitrate of soda up to 20 per cent. If you try, therefore, to leach out the noxious salts by irrigation you will remove also the latter, which may make the land so productive. You cannot wash off the efflorescence on the surface by a rush of water, or do much good by allowing water to stand on the land and then to draw it off, but you may succeed in getting rid of one-third, or even one-half, of all the salts in one season by removing them with more or less earth at the end of the dry season either by sweeping or by means of a horse scraper. Very little carbonate of soda—not more than one-tenth of 1 per cent. must be in some soils in the first foot from the surface if cereals are to be grown—renders land useless for cultivation, but the transformation of the carbonate into sulphate of soda by means of gypsum (land plaster) and water is frequently sufficient. But, as Professor Hilgard says in a letter of the 30th of August last, "that in general the experiments he has made of Australian alkali soils have shown a great preponderance of common salt and little or no carbonate of soda, he has not had occasion to recommend the use of gypsum for reclamation." Farmers should first ascertain by assay whether carbonate of soda is present in quantity. If not, the application of gypsum is simply a useless expense of money and labor. Professor Laughridge warns also for purchasing impure gypsum, he having examined samples that contained less than 75 per cent. and some even as low as 40 per cent. of pure gypsum. This accounts, of course, for failure if sufficient gypsum is not applied. Theoretically, the amount of gypsum applied should be about one-third more in weight than the amount of carbonate of soda present in the spot. A test was made with a soil with an extreme of carbonate of soda, the analysis showing .223 per cent. in .772 per cent. of total salts. Two portions of it were mixed thoroughly with gypsum in the proportion of 1.4 per cent. of gypsum to 1 per cent. of carbonate of soda, one merely moist with water, the other kept fully wet. After a week the results were that the percentage of carbonate of soda was reduced in the moist sample to .177 per cent., in the wet to .153 per cent.; but after twenty-eight days it had increased to .195 per cent. and .167 per cent., perhaps through not coming in contact with all parts. On using to other samples twice the quantity of gypsum the results were most effective, as the carbonate of soda was reduced from .263 per cent. to .26 per cent. and .021 respectively. An excess of gypsum can do no damage unless the soil becomes water logged, and besides it is not at all necessary to apply it all at once. It may require a few hundred pounds, or a ton, or even more, per acre from time to time harrowed in, that is about twice the theoretical amount. It acts in wet soils within a few weeks, in damp in the course of months, when it crumbles and bulges into a loose mass, into which water soaks freely, bringing the previously depressed black spots to the general level of the land. On the effect of applying gypsum, Professor Hilgard reports that a tract of 50ft. to 300ft., which had previously only a small depressed spot which indicated alkali, showed, after irrigation in autumn, 1893, alkali salts on the entire surface, and killed all the fruit trees. In 1894 and 1895 this land received each year $1\frac{1}{2}$ tons of gypsum per acre, with the result that in 1894 (a very dry season) about half of the land bore barley hay at the rate of 1 ton per acre, growing 2ft. high, and maturing seed where not cut. In 1896 the barley sown refused to germinate only within 100ft. of the original spot; the rest of the land yielded at the rate of $2\frac{1}{2}$ tons per acre. It seems, however, that in many cases the soil may be so heavily impregnated, even to a depth of 4ft. that nothing but leaching out of a large portion of the salt by under drainage will serve any useful purpose. In this regard the Fresno Vineyard Company has given a good example of wise precaution by drawing a 7ft. ditch around their vineyard, and they now have no need to fear alkali or swamping from leaky or leachy drains over hardpans. Hardpan, impervious to roots and water at some depth, is probably the cause in Renmark, where the young trees and vines either dried out or were drowned out, after some years of good growth, as soon as they reached it, or the cause was one of the following:—Professor Woodworth recognises four distinct effects produced on trees by alkali. The girdling near the surface of the ground; the destruction of the root hairs; the concentration of the alkali in the green parts; and the burning due to soil radiation. The girdling is simply a burning of the bark by the crust of alkali on the surface, and the use of gypsum and periodical replacing of the soil around the stem with other

soil comparatively free from alkali, or with gypsum, may be a sufficient remedy. The second injury shows itself exactly as with drought, although the soil may be more than damp. The leaves dry gradually, beginning at the tips and edges, the youngest dry up. The small, hair-like rootlets, being extremely delicate, have been destroyed by the rising and falling of the alkali during the season as new spots, increasing from year to year in extent, show up. The third distinct effect seems to produce the dropping of grape blossoms and the very small berries (couleur) from an accumulation of alkali salts in or on parts of plants subject to greatest evaporation. The edges of the leaves may become crisp and burned while the veins remain normal and the roots seem healthy. The fourth injury occurs from the peculiarly strong radiating power of an alkali soil, and the reflected rays of a very hot sun more than the direct rays may burn the edges of the leaves of trees at the lower parts where most exposed to the combined action of the direct and reflected heat. The greatest damage to trees and other plants by alkali is done near the base of the trunk, or root crown. The bark turns brownish, becomes soft, and is easily peeled off. Practically the plant, as before stated, is girdled. This indicates clearly that the accumulation of salts is chiefly near the surface, and that trees and vines already planted may be somewhat protected from the worst effects of the black alkali by surrounding the trunks with gypsum, or with earth abundantly mixed with it. Sometimes it may not be necessary, and would perhaps not pay to neutralise the whole of the carbonate of soda by means of gypsum, for which many tons might be required. Maintaining a loose tilth of the surface for many inches, which is not easily done, throughout the times when evaporation is active, and hoed crops in preference to grain crops, are likely to be more successful. Cropping with plants that take considerable quantities of salt from the soil may also be sufficient where the salts do not prohibit all cultivation. Our Australian saltbushes (*Atriplex* species), so readily eaten by all kinds of stock, demand first consideration. *Atriplex semibaccata* contains as much nutritive matter as lucern, and is ahead of oaten hay as one to four, and of barley hay as one to nine. Saltbush has proved in California most excellent for de-salting or freeing the soil from objectionable sodium compounds. For every 100lbs. of air-dried saltbush or 400lbs. of green there are 19.37lbs. of pure ashes, of which 40 per cent. is common salt, 15 per cent. is soda in several combinations, mainly in the form of carbonate of soda. Analysis showed that the total injurious salts extracted by a crop of saltbush was 2.63lbs. per acre. In another place it is said that saltbush takes up nearly one-fifth of their dry weight of ash ingredients, largely common salt; so that the complete removal from the land of a 5-ton crop of saltbush hay will take away nearly a ton of the alkali salts per acre, and by thus, in the course of a few years, reducing materially the saline contents of the land you may render the culture of ordinary crops possible. The seeds of saltbush are reported to come up easily on land of which the surface foot contains one-third of 1 per cent. of salts; but where there was one-half of 1 per cent. the plants languished, the surface 12in. containing not less than 31,000lbs. of total salts per acre. The plants died when the accumulation rose to over 25 per cent. of the first 1in. And it is mostly the case that the great mass of alkali is drawn upwards and concentrated in the first few inches, so much so, that the crust may contain more than half of the total amount. Next to saltbush, grape vines tolerate as large an amount of alkali, viz., 23,830lbs. in the first foot of an acre, that is 13,570lbs. of glauber salts, 7,980lbs. of common salt, 670lbs. of nitrate of soda, but only 1,610lbs. of carbonate of soda. Wheat and barley, while tolerating 20,520lbs. of alkali, will still grow in 7,040lbs. of carbonate of soda, but only where up to 4,520lbs. of common salt is present, 4,320lbs. of nitrate of soda, and 11,120lbs. of glauber salt; but from the description of *modiola*, a native of Chili (*Modiola decumbens*), given by Mr. J. B. Davy, it seems that he has found another plant worth cultivating on strongly alkaline soils (up to 52,400lbs.), as a fodder, of which cattle and sheep are fond, yielding abundantly. As it roots freely at the joints it may be difficult to eradicate. Common salt may be present to as much as 40,840lbs. carbonate of soda to 4,760lbs. Mr. Davy does not say whether it is much like saltbush in de-salting the land. The following list of fodder plants suitable for cultivation as fodder plants are mentioned:—Of saltbushes—*Atriplex semibaccata*, *A. leptocarpa*, *A. halimoides*, *A. Muelleri*, *A. nummularia*, *A. vesicaria*, *A. spongiosa*, *Kochia californica*, *K. eriantha*, *K. pubescens*, *K. villosa*, *Modiola*, and a grass (*Beckmannia erucaeformis*), the latter only of value for wet alkali soils.

276. *New Must-Cooler*.—Professor Hilgard, of California University of Agriculture, reports that they have devised and successfully used a new kind of cooler for wine must during fermentation, which enables the "pure yeasts" to exert their best influences. It involves the use of an air blast and water spray in place of water only as in previous forms of attenuators. The new cooler requires less water and shorter length of coil and cooling surface.

277. *New Potatoes raised in Germany*.—I have distributed them to all applicants in proportion to the quantities I had; to the largest number seven kinds. They were received in admirable order considering that they had been on board since the 8th day of October, fully ten weeks. The packing was also worthy of notice. One box was filled with fairly fine charcoal, the other with ground turf. I prefer the latter. The boxes had six airholes fitted with wire. Bags of the full length and width of the boxes were loosely filled with the potatoes, so that they did not touch each other. In each box there were six bags above each other, divided by

the coal or turf. I found one tuber slightly bad, apparently from having been trodden upon at packing; all the rest were sound. They were forwarded from Greisitz, near Sagan, by Fr. Westmann, who is doing a very large business in forty-five kinds of potatoes, and the selection was left to him, except that the Professor Maercker was mentioned. Of Thiel, Gratia, and Ehlers I can find no description in my catalogues. The first five were raised by Cimbal—1. Hero, late, large, fine form, light-red, delicate taste, flat and few eyes; good in dry seasons, keeps well, and is safe against fungi. 2. Silesia, was certificated in 1894 by the Agricultural Society of Germany, white, netted good size of an equal nice form, few flat eyes; good in wet and dry seasons; starch from 21 per cent. to 24 per cent.; quite safe against fungi. 3. Wohltmann, red, prolific, mostly large, flat eyes; keeps well; is rather late; from 18½ per cent. to 24 per cent. starch; safe against fungi. 4. Wilhelm Korn, flat oval, eyes flat, white, parchment-like leaves; middle early; does well everywhere. 5. Max Eyth, the best out of 6,000 seedlings, light-red with white marks, flat oval, eyes dark-red, fairly large; good on light as well as on heavy soil; ten and more tons per acre, and some call this potato the World's Wonder; it keeps well, starch from 22 per cent. to 25 per cent.; withstands drought. The next two are raised by Richter. 6. Professor Maercker, white, prolific, large, middle early; not suitable for heavy soil, during five years never a diseased potato. 7. Thiel. The next four are raised by Paulsen. 8. Sirius, oval round, large, white, late, prolific. 9. Pluto, round, oval, red with dark-red eyes; prolific; starch 19 per cent. to 20 per cent. 10. Gratia. 11. Cygnea, white, large, prolific; starch 17½ per cent.; in 1897 gave 22cwt. from 1cwt.; free from disease in wettest years. 12. W. Ehlers. Recipients are requested to report and to return some for further distribution for winter planting.

Branch Conferences.

The SECRETARY reported that Conferences of Branches would be held at the following places:—

Northern Branches, at Gladstone, on February 17; Southern Branches, at Strathalbyn, on March 24; South-Eastern Branches, at Naracoorte, on March 29.

The question of sending representatives to these meetings from the Central Bureau was held over pending settlement of financial matters.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Petersburg, Mr. D. McNaughton; Lipson, Mr. J. McCallum; Riverton, Mr. Fred. Calf, jun.; Inkerman, Mr. Geo. Peter; Swan Reach, Messrs. G. W. Wilson and R. Barrow; Narridy, Messrs. Ernest Smart and Edgar Smart; Morphett Vale, Messrs. H. Anderson, F. Hutchison, J. Depledge, and J. Bain.

Reports by Branches.

The Secretary reported receipt since previous meeting of forty reports of Branch meetings.

REPORTS BY BRANCHES.

Mount Remarkable, December 22.

Present—Messrs. H. B. Ewens (Chairman), S. Challenger, W. Lange, G. Yates, C. E. Jorgensen, J. B. Murrell, D. Roper, and T. H. Casley (Hon. Sec.).

CO-OPERATION.—The Hon. Secretary's paper on "Manual Producers" was again discussed. He contended that through want of unity the manual producers, upon whom the rest of the workers were really dependent, were imposed upon by the middleman. Although the wheatbuyers and storekeepers had in many cases been a decided benefit to the farmers, and had tided them over bad times, they were unnecessary to the business of the farmer, and took the lion's share of the results of their work. He strongly urged the necessity for co-operation, and advocated the extension of the business of the Farmers' Co-operative Union, which could only be accomplished by the farmers laying

aside their fear of one another and joining the union. The producers should have their own salesmen, and buy their requirements direct from the manufacturers. In their own district they might well co-operate, and erect a flour mill and produce store, to be run solely by the producers. Correspondence relating to cost of a gristing mill was read and discussed at length, and it was decided to obtain further information as to cost.

DART'S IMPERIAL WHEAT.—Mr. Lange reported that 10lbs. of seed, hand-reaped, was sown on quarter of an acre. The crop was cut, and thrashed by means of a flail, resulting in a yield of 6bush. of splendid grain. The Hon. Secretary sowed 2,040 grains in 1897, reaping $\frac{1}{2}$ bush., hand-thrashed. This was sown on an acre of new land this year, and two and a half bags of splendid grain was stripped. The straw was good, the wheat easy to strip, and weighed 65lbs. to the bushel.

Woodside, December 12.

Present—Messrs. R. Caldwell (Chairman), C. W. Fowler, A. Lorimer, A. S. Hughes, J. Cuthbertson, J. H. Snell, N. Schroeder, J. C. Pfeiffer, G. F. Lauterbach (Hon. Sec.), and two visitors.

DAIRYING.—Mr. Cuthbertson reported that the Jersey bull, "The Baron," loaned by the department, was in perfect health and condition, and his progeny look very promising.

THE HARVEST.—Mr. Caldwell read a paper entitled "Some Remarks on the Harvest of the Present Season." After reviewing the weather during the season, he expressed the opinion that the harvest would not average more than 5bush. per acre, which, at 2s. 6d. per bushel, and deducting requirements and cost of seed sown, would only leave the farmer about 6s. 6d. per acre to pay for growing and harvesting the crop, to say nothing of rents, taxes, &c. Such results would certainly not improve the position of the producers. He considered the results of the experiments in the use of commercial fertilisers decidedly satisfactory. Members expressed the opinion that the seed drill had proved a very satisfactory acquisition to the farmer, but doubted whether it would be profitable to use it without manure, as they thought the extra return from simply putting the seed in with the drill would not pay for the extra expense.

Koolunga, December 22.

Present—Messrs. T. B. Butcher (Chairman), J. Button, R. Palmer, jun., J. Jones, R. Jackson, R. Lawry, E. J. Shipway, W. J. Jose, W. T. Cooper, F. E. Chick (of Lyryp Branch), and two visitors.

ENSILAGE.—Mr. Jones read a paper on this subject. The following is a short abstract:—

A perfect knowledge of why we perform certain acts will nearly always enable us to secure results aimed at. A fair knowledge of the action of the various ferments will enable us to make good ensilage. Green fodder, if merely cut and thrown into heaps, will soon ferment and decay; but that same green fodder can be preserved in its most succulent and nutritious condition if we control the action of the ferments which cause that decay. The ferment or bacterium causing decay is similar to that which causes milk to turn sour—the lactic ferment—and this ferment cannot exist in a temperature above 120° F. In the first stages of fermentation this lactic ferment must have a good supply of atmospheric air, from which the oxygen is abstracted, and the temperature is considerably raised. When the bacterium is fully started in its work it can exist without atmospheric air, manufacturing its oxygen from the sugar in the substance being acted upon. When the green herbage is placed in the silo or stack there is always a plentiful supply of ferment germs in it, and they quickly begin to multiply, and thus the temperature is raised rapidly. At the expiration of about eighteen hours, under ordinary conditions the temperature of the green stuff will have risen to 135° F., and if the

air is then excluded the bacteria, or ferment, will have been killed, and fermentation will cease. To exclude the air it is only necessary to put on another thick layer of green stuff, or else to cover with planks or boards and put on weight or pressure. If the heat is allowed to rise above 140° F. the ensilage will be blackened, and almost charred. If the heat is less than 120° F. the ensilage will be spoiled. Sour ensilage is produced by stopping the fermentation at about 120° F. to 125° F., and sweet ensilage at temperatures above 125° F. and under 145° F. Fodder intended for ensilage should be cut after flowering, and when the seed has begun to form. It is best to cut it whilst the sun is shining. The fodder should be spread evenly in the silo or on the stack, and pressed down well on the margin. Coarse fodder, such as maize or sorghum, should be chaffed into the pit, else the air will too readily find entrance, and fermentation, moulds, and mildews will be set up afterwards. Finer herbage, such as grass, &c., may be put in without chaffing. Whilst stacks can be put up at small cost, there is probably enough waste caused to pay for the excavation of a pit, and this need not be expensive if the soil is sufficiently solid to allow of firm perpendicular walls.

SEED EXPERIMENTS.—Several members reported on experiments with seeds received from Central Bureau. The results were not up to expectations owing to dryness of the season. In several cases Dart's Imperial wheat failed to come into ear, although it grew well at first. The members thought it would prove a good variety for later and cooler districts, as it stood splendidly. Several varieties of oats also grew well, but failed to come into ear. Members thought the White Schonen oat would be worth trying in the later districts. Quantity and Profusion peas were good, the latter being the better of the two. Only a small percentage of Kaffir corn seeds germinated, and of these the red variety was doing best. Samples of Golden Return and Dart's Imperial wheat, both in straw and thrashed, also Profusion and Quantity peas, were tabled by Mr. Button.

Lucindale, December 24.

Present—Messrs. E. Feuerheerd (Chairman), S. Tavender, J. Bourne, A. Dow, and J. H. Deeble (Hon. Sec.).

GARDENS.—Grubs, caterpillars, and other insect pests are very prevalent this season.

CEREALS.—The cereal crops as a whole are very good this year.

LIVE STOCK.—Mr. Tavender stated that his sheep have a film over their eyes, ultimately resulting in blindness. [Mr. C. J. Valentine recommends 4ozs. opium and 1qt. rainwater (or spirits and rainwater). Separate the blind sheep and keep them in a shed for a few days. Wash the eyes with above mixture twice a day for a week, and then once a day if they require it.—GEN. SEC.]

NARACOORTE CONFERENCE.—The Annual Conference of South-Eastern Branches of the Agricultural Bureau is to be holden during March next at Naracoorte, and the Chairman desired members to save and prepare exhibits of products, home industries and manufactures, &c., for the occasion.

EXHIBITS.—Mr. Dow showed a broom made of indigenous "black grass" which he said had been in use for ten years. Mr. Sutton sent a sample of piebald wool.

Craddock, December 24.

Present—Messrs. R. Ruddock (Chairman), Jos. Turner, J. Paterson, J. Clarke, J. H. Iredell, P. Gillick, A. E. Clarke, J. H. Lindo (Hon. Sec.), and one visitor.

WHEAT-GROWING.—It was decided that members should, at next meeting, furnish particulars of yields of the crops. Mr. Paterson said they should pay special attention to varieties, as it was important that they should study the varieties most suitable for the district. Mr. Jas. Clarke had observed this year that wheat growing on the western slopes of the land did better than that on the eastern slopes. This was attributed by members to the eastern slopes being more affected by frost.

STOCK COMPLAINTS.—Mr. A. E. Clarke asked how to detect symptoms of tuberculosis in cattle. The Chairman reported loss of a number of cows from some unknown cause. Members thought the excessive heat affecting the milk was the cause. Mr. Gillick asked what caused so many horses to go blind. Mr. A. E. Clarke considered it due to the "poison creeper," while Mr. Paterson said they often injured their eyes trying to rub off the flies.

Forster, December 21.

Present—Messrs. A. Johns (Chairman), J. Johns, F. Johns, J. Retallack, J. Sears, C. Bolt, J. R. Bolt, F. Towill, A. Retallack, J. D. Prosser, T. Prosser, W. H. Bennett (Hon. Sec.), and five visitors.

HARVESTING, &c.—An instructive discussion occurred upon harvesting, strippers, reapers, &c.

OFFICERS.—Mr. A. Johns was re-elected Chairman. Mr. F. Towill was elected Vice-chairman, and Mr. J. D. Prosser Hon. Secretary.

EXPERIMENTS.—Mr. A. Retallack obtained 100z. from $\frac{3}{4}$ oz. Golden Return wheat, and similar results from $\frac{1}{2}$ oz. Dart's Imperial. Mr. A. Johns got 2lbs. seed from 1oz. Dart's Imperial; $1\frac{1}{4}$ lbs. from 1oz. White Monarch; and $26\frac{1}{4}$ lbs. seed from $1\frac{1}{4}$ lb. Golden Return wheat.

Inkerman, December 27.

Present—Messrs. Jas. Sampson (in chair), W. Board, E. M. Hewett, S. Wills, and W. A. Hewett (Hon. Sec.).

SEED EXPERIMENTS.—Mr. S. Diprose reported that Golden Giant Side oats appeared identical with White Tartarian, and was not suitable for this district. White Monarch oats were almost a failure. Swede turnips grew well, but went to seed too early. Mr. Sampson had good growth of straw from Golden Return wheat, but the grain was pinched. From ten heads he obtained 509 grains. From the same number of heads of Dart's Imperial wheat he got 317 grains, but these scaled heavier than the larger number of the other variety. The first named should be a good wheat for hay, and the latter for grain. Mr. E. M. Hewett had plants of wheat with forty stools from which every grain had been taken by sparrows while still green. Mr. Strongman reported unfavorably of Quantity, Profusion, and Laxton's Evolution peas. Trooper barley failed with the dry weather in September, and he could not find a single grain in the plot.

PRICE OF WHEAT.—The following resolution was carried:—"That the present low price of grain renders it desirable to consider what immediate action should be taken by producers to profitably dispose of their produce." Mr. Board's experience in England, coupled with limited practice in this colony, led him to the conclusion that for fodder wheat was of more value than is now offered for the grain. He believed that sheep for the butcher could be profitably fed on grain; the addition of a pint of corn per day in addition to paddock feed would return enough to raise the value of the feed at least 1s. per bushel. Fat cattle, pigs, and poultry, the two latter especially, could be profitably utilised to obtain better value for their grain than can be obtained by direct sales. It would pay to have the corn crushed at 4d. per bushel—the local charge for this work. In considering the profit from the disposal of the grain in the shape of sheep, pigs, &c., it must be remembered that the cost of sowing this produce to market would be no more than sowing wheat. Then bran was splendid for increasing the flow of milk from dairy cows, and he believed crushed wheat would also pay for this purpose. Members agreed

generally with these ideas, and it was decided to send a copy of the resolution to several neighboring Branches to ascertain the opinions of the members on the subject.

INSECT PESTS.—Mr. Board tabled specimens of two grubs found in the soil, and which have done much mischief in the district to wheat, potatoes, vines, &c. [One is the grub of the cockchafer beetle, and can only be checked by catching and destroying the mature beetles when they appear above ground. The other is a night-feeding caterpillar, and can probably be destroyed by means of the Paris green, bran, and treacle mixture.—GEN. SEC.]

Nantawarra, December 28.

Present—Messrs. C. Belling (Chairman), R. Uppill, A. L. Greenshields, E. J. Pridham, Jas. Nicholls, H. J. C. Meyers, R. Nicholls, E. J. Herbert, and T. Dixon (Hon. Sec.).

SEED EXPERIMENTS.—The Chairman reported that White Monarch wheat was unsuited to the district, as it was very open in the chaff and late; it suffered more than the ordinary varieties from the dry weather. Mr. Jas. Nicholls said Dart's Imperial wheat was rather late, but withstood the rough winds well. The Hon. Secretary got a return of 17bush. from this variety. Although late it stood up well, and he intended giving it a further trial. Mr. Uppill found Long White Tankard turnip a failure, and not nearly so good as ordinary kinds grown under similar conditions.

BONEMEAL.—Mr. Herbert said the addition of a little bonemeal to their feed would be found a good remedy for cattle affected with stiffness in the legs. Members wished to know whether the fertiliser sold as bonemeal was the thing to give their stock. [Yes, unless the stuff is adulterated.—GEN. SEC.]

Gawler River, December 30.

Present—Messrs. A. M. Dawkins (Chairman), R. Badcock, F. Roediger, D. Humphries, J. S. McLean, T. P. Parker, G. Johnston, H. Roediger (Hon. Sec.), and one visitor.

MANURING.—Considerable discussion took place on the results obtained from use of commercial fertilisers. Members generally reported favorably of the results, and will continue to use these fertilisers. Mr. S. L. Dawkins (visitor) considered bonedust the most profitable manure to apply, but he had good results from other manures. Members considered each one would need to experiment for himself to determine which fertilisers suited best their particular soils. The Chairman was of opinion that the only benefit derived from putting the fertiliser in the ground before sowing was that it facilitated seeding operations. Mr. McLean thought that the extra working of the land after application of the manure, especially if scarified in, would mix it thoroughly with the soil, and cause the roots to develop better, thus ensuring a heavier crop. The Hon. Secretary said he had drilled these fertilisers in by themselves, then broadcasted the seed and scarified it in, and got very heavy crops. Members wished to know when the Fertilisers Act of 1898 would be enforced. [The Act is now in operation, and inspectors have been appointed to see that vendors of fertilisers comply with the provisions of the Act. Any neglect to do this should be at once reported, with full particulars, to the Inspector of Fertilisers, Adelaide. (See *Journal of Agriculture and Industry* for January, page 499).—GEN. SEC.]

SEED EXPERIMENTS.—The Hon. Secretary tabled samples of Mensury and Trooper barley, the former of which shelled badly. He also distributed seeds of peas grown by himself from a few seeds received in September from Central Bureau.

RAINFALL for 1898, 19·57in.

Swan Reach, December 29.

Present—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, F. F. Brecht, F. Fischer, E. Micke, G. Grieger, P. A. Beck (Hon. Sec.), and two visitors.

BRANCH SHOW.—It was decided to hold the annual combined Branch Show in connection with the River Murray Branches at Swan Reach at a date to be fixed.

HARVEST.—Members reported that the wheat yield for the hundred of Fisher would average about 3bush., hundreds Nildottie and Mantung about 3½bush. to 4bush. Up to the middle of September the crops promised exceedingly well, but the absence of rain up to end of September was responsible for the failure of the crops. In isolated cases up to 12bush. and 14bush. per acre have been reaped. The sample generally is not first-class.

Stockport, December 27.

Present—Messrs. G. Burdon (Chairman), C. W. Smith, J. Smith, D. G. Stribling, C. F. Jorgensen, J. Smith, jun., S. Rodgers, S. Smith, J. Murray (Hon. Sec.), and three visitors.

EXPERIMENTS.—Mr. C. W. Smith tabled sample of Red Straw wheat 3ft. 6in. long, with splendid heads. It was decided that at next meeting members should bring written reports of results of various wheats tried, manures used, &c.

Stansbury, January 7.

Present—Messrs. Alexander Anderson (Chairman), J. Sherriff, P. Anderson, H. C. Pitt, G. Jones, and one visitor.

HARVEST AND MANURING.—Members reported that the crops were turning out better than was expected. Considerable discussion took place on the best manure to use in this district. The general opinion was that every farmer would have to experiment for himself, as the results from different manures vary according to the soils.

Naracoorte, January 7.

Present—Messrs. O. Hunt (Chairman), S. Schinckel, E. C. Bates, A. Johnstone, G. Greenham, and D. McInnes (Hon. Sec.).

SOUTH-EASTERN CONFERENCE.—Correspondence from various Branches on the forthcoming Conference was discussed, and it was decided that the date originally fixed, viz., March 15, be adhered to. In reply to inquiry as to arrangements for the Conference, the Secretary of the Tatiara Branch wrote as follows:—"I beg to inform you that the following was the order of procedure of the Bureau Conference last year. (1) We formed ourselves into committee of the whole, and then we formed our sub-committees out of it as follows:—(1) A reception committee to meet our guests; (2) an exhibit committee of three members; (3) a refreshment committee; (4) and a programme committee. The refreshment committee then sent notices to the wives, sweethearts,

mothers, sisters, and housekeepers of farmers in the district informing them that we wanted provisions, &c., &c., and asking them to have a ladies' meeting and make arrangements. This was done, and free tickets were sent to influential farmers and then their wives assisted. All the food was thus given, and much more than was required. Tea was provided for the public at 1s. each. Of course all our members and guests were free, and we had so much left that we invited the public to supper at 6d. each. The ladies did all the waiting. . . . Some of our people gave money rather than be bothered with cooking, and this paid for the tea, coffee, sugar, &c. Call a meeting of your Branch when you think it advisable to get in progress reports from the sub-committees. Those who take an active part in shows are good for the exhibits committee, and those who take a part in church tea meetings are good for the refreshment committee." [Members of Branches arranging for Conference might take a hint from this outline of arrangements for such gatherings.—GEN. SEC.]. Various committees were appointed to arrange for the conference.

DISEASES OF STOCK.—The Chairman referred to prevalence of ticks on fowls in other districts, and urged members to be careful not to introduce the pest into this locality, where at present it was unknown. Mr. Bates said he found kerosine and water a good remedy, but it would pay them better to take active precautions in the first place to keep the insect out of their poultry yards. The Chairman said he noticed from other Branch reports that warts on cows' teats were prevalent. He had heard that the application of castor oil would cure them.

DRY AND WET MILKING.—Mr. Bates initiated a discussion on this subject. Wet milking was, he knew, customary, but he considered it a bad and unclean custom. He found dry milking far better.

FRUIT PEST.—The Chairman reported that the Rutherglen fly had been attacking the peach trees in his garden, but the recent rain had washed them off. An application of benzine was said to be an effectual remedy for this pest. Mr. Greenham said benzine was very inflammable, and great care should be exercised by people using it.

HEDGES.—For hedges and breakwinds carobs, olives, African boxthorn, tree lucern, and cypress were mentioned as being suitable.

Morphett Vale, January 4.

Present—Messrs. Thos. Anderson (in chair), J. Spriggs, J. McLeod, J. Perry, A. Ross Reid (Hon. Sec.), and several visitors.

SUMMER CULTIVATION OF VINEYARDS AND FALLOW.—The Hon. Secretary read the following paper on this subject:—

Though to some persons it may sound curious to class these two subjects together, yet I think that, as the main object in both cases is the same, it is justifiable. It is only of late years that thorough summer cultivation has been carried on to any extent in South Australia, and perhaps even now it is not as thoroughly understood as its great importance deserves. The main object, with our dry summers, is undoubtedly conservation of moisture, and to do this effectually it is necessary that the cultivation be continued right through the summer, or in the case of vineyards as late as possible. In vineyards it is nearly always practicable to use a Planet Junior cultivator, cutting about 4ft. 6in., with two horses driven tandem. As to how often we should cultivate, this depends greatly on the class of soil, and on the weather; but the object is to keep the ground from cracking, for as soon as we see cracks in our land we know that evaporation is going on rapidly. Of course the most important time to cultivate is shortly after any heavy rain, such as we experienced at the end of November. As to depth of cultivation, in this climate I do not think that cultivation can be too deep, provided we do not touch the sub-soil. I have heard people argue that it is a mistake to cultivate deeply in summer, because by so doing moist ground is often brought to the surface, but this small amount is very infinitesimal compared to the large amount preserved by having that loose

coating on top, and even if it be down 2ft. or 3ft. it will rise to the top, for roots of wheat, &c., to use. I can give a proof of this. Eighteen months ago I planted some vines in a limestone and ironstone soil. Owing to the dry weather setting in early the ground got hard. I cultivated one-half and got a nice tilth of about 3in., and the other half I ploughed deep with a single-furrow plough, turning up a lot of moist earth, which remained dry during most of the summer; yet at the present time the vines I ploughed are making much more vigorous growth than the others, and the line is as distinct as if drawn with a rule. If any members disagree with me I am sure we shall be all pleased if they will experiment themselves and let us know the result. Next, as to implements to use. I am sure that too frequent use of the harrows is to be avoided, as they set the ground tight, with the exception of about 2in. on top. Personally, I have seen no better implement than the Planet Junior cultivator. As soon as all the weeds are killed I prefer to take off all the wide shares and use only narrow ones, which move all the ground and go deeper than the wide ones. In vineyard work it is better, instead of using one-horse swings, to use belly-spreaders, which any blacksmith will make for about 2s. They are usually made of 1in. by $\frac{3}{4}$ in. iron, but the shape of the horse's belly, with a hook to fasten to the chains on either side of the horse, and made sufficiently long to keep the chains clear of the horse on either side.

The Chairman found deep cultivation did not answer in his vineyard, which was planted in limestone soil. Mr. Bain (visitor) favored deep cultivation, but not much harrowing of fallow land.

WEEDS.—A discussion took place on this subject. Mr. Perry tabled weed for identification. The Hon. Secretary said many sheep men were of opinion that the destruction of the common star thistle was a mistake, as it does no harm in the hay crop and is readily eaten by sheep. If they are found troublesome in paddocks in the district used for grazing cows a few sheep would soon kill them.

PICKLING SEED WHEAT.—Mr. Depledge (visitor) said he found pickling with 3ozs. of bluestone and three double handfuls of salt to the gallon of water a success in preventing bunt.

Narridy, December 31.

Present—Messrs. A. McDonald (Chairman), D. Creedon, J. Nicolson, R. Satchell, H. Nicholls, W. J. Martin, J. Liddle, and J. Darley (Hon. Sec.).

DAIRYING.—Considerable discussion took place on the best breed of dairy cows for this district. Members were of opinion that the Jersey crossed with the Shorthorn was the most suitable.

SELF-SOWN HAY.—Members would like the opinion of other Branches on the following points *re* self-sown oat hay:—(a) When is the best time to cut the crop? (b) What would they mix with it to make it more acceptable to stock?

Mundoora, December 30.

Present—Messrs. J. Blake (Chairman), J. Watt, W. Aitchison, J. Loveridge, D. Smith, A. McDonald, W. D. Tonkin, T. Haines, G. Haines, W. J. Shearer, and A. E. Gardiner (Hon. Sec.).

CONFERENCE AT BUTE.—Matters in connection with the forthcoming Conference of Northern Yorke's Peninsula Branches at Bute, on March 8, were discussed.

HARVEST AND STANDARD BUSHEL.—Members agreed that the average wheat yield for the district would not exceed 3bush. per acre, this poor return being due to lack of rain at end of winter and early in spring. The question of the standard weight for the season was the subject of an animated discussion. Some members considered 63lbs. too high for the season, but others were satisfied with the standard, so that no decision was arrived at, the matter being left open for further consideration.

Clare, January 13.

Present—Messrs. J. Christison (Chairman), W. Kelly, W. S. Birks, J. Radford, H. Carter, J. Treleaven, and J. T. Hague (Hon. Sec.).

CODLIN MOTH.—Mr. G. Lewcock wrote asking what steps were being taken to prevent the introduction and spread of codlin moth caterpillars in the district through the exchange of fruit cases. It was decided to ask the local inspector what precautions were being taken.

DAIRYING.—The paper on "Dairy Cattle," by the Dairy Instructor, was the subject of favorable comment.

Meadows, January 9.

Present—Messrs. J. Catt (Chairman), T. B. Brooks, H. V. Wade, W. Collins, W. Nicolle, G. Rice, and W. A. Sunman (Hon. Sec.).

BRANCH SHOW.—The whole of the evening was occupied in making arrangements for the annual show of products in connection with the Branch, which is to be held on March 2.

Port Lincoln, December 16.

Present—Messrs. S. Valentine (Chairman), J. D. Telfer, W. E. Goode, E. Chapman, G. Dorward, J. P. Barrand, and J. Anderson (Hon. Sec.).

WEED.—The Chairman tabled weed for identification. This came with seed wheat from Adelaide, and is spreading rapidly in the crops about Lake Wangary. Stock will eat it if very hungry and the plant is pulled, but do not touch it in pastures. [This is a common introduced weed, *Silene gallica*.—GEN. Sec.].

BRANCH SHOW.—A committee was appointed to make arrangements for forthcoming Branch show.

Belair, January 16.

Present—Messrs. O. Nootnagel (Chairman), G. Wescombe, W. J. Bartlett, and G. R. Laffer (Hon. Sec.).

MEMBERSHIP.—Regret was expressed at the death of Mr. Alex. Murray, late Chairman of the Branch, and it was decided to send a letter of condolence to the family. It was decided to make an effort to get suitable gentlemen to join the Branch, in order to enlarge its sphere of usefulness.

Lyrup, January 8.

Present—Messrs. A. Thornett (Chairman), W. Healy, D. Thayne, D. J. Bennett, T. R. Brown, P. Brown, W. H. Wilson (Hon. Sec.), and seven visitors.

ONION PEST.—The Chairman asked for information regarding an insect which attacks the onions, eating its way into the bulbs from the tops. No one present knew anything about this pest.

BINDER AND STRIPPER.—Mr. P. Brown read Mr. King's paper on this subject from the Report of the Tenth Bureau Congress, and considerable discussion ensued. Mr. Brown considered each machine had its legitimate use, and that in varying circumstances either might be more preferable than the other to use. Mr. Thornett agreed, but would not consider it advisable to harvest a crop under 2ft. in height by means of the binder. The practice of

rolling the stubble after the stripper has been over it, and raking it up for feed, was a mistake, as various foreign matters were gathered with it, and had an injurious effect on stock feeding on them. If the stubble was cut with the mower, the latter being drawn in an opposite direction to the stripper, the straw would be cleaner and better. Members generally were of opinion that it was advisable to have both binder and stripper on the farm, and to use them as individual circumstances make advisable.

Albert, January 7.

Present—Messrs. J. Brewin (Chairman), G. Haggard, G. Acres, T. Cooper, J. Wetherall, A. C. Rasmussen, A. B. Struthers, H. Lane, and H. L. Smith (Hon. Sec.).

POULTRY.—Mr. Cooper initiated a discussion on this subject, and strongly advocated keeping well-known breeds of poultry both for laying and for table purposes.

CEREAL EXPERIMENTS.—Mr. Wetherall tabled samples of Trooper and Beardless barley. One-quarter of an ounce of Trooper barley sown on May 6 in dry ground was harvested at the end of November, 2lbs. 10ozs. of fair quality grain being received. The rainfall during growing period amounted to 5.48in. Forty-six grains of Beardless barley under same conditions yielded 1lb. 5ozs. of good grain. Members thought that if the Beardless barley was suitable for malting it would pay to grow here.

Yorke town, January 14.

Present—Messrs. J. Koth (Chairman), C. Domaschenz, A. Jung, and John Davey (Hon. Sec.).

PETATZ SURPRISE WHEAT.—This variety of wheat having been reported to be early in maturity, a good yielder, drought-resistant, not liable to shake out with the wind, and having given 17bush per acre, weighing 68lbs. per bushel, it was resolved to procure a small lot for trial in this district.

HARVEST.—The wheat harvest has now been gathered in, and has proved satisfactory where the grubs of *Scitula geminata* (a small cockchafer) have not damaged the crop.

Mount Gambier, January 14.

Present—Messrs. J. Umpherston (Chairman), G. Collins, A. J. Wedd, M. C. Wilson, James Bowd, J. Watson, W. Mitchell, T. Edwards, and E. Lewis (Hon. Sec.).

DAIRYING—Mr. J. C. Ruwoidt forwarded report on Jersey bull loaned by the Department of Agriculture. During the past six months twenty-four cows had been served by the bull, and the progeny of those served during the previous term consisted of eleven heifers and nine bulls. Some discussion took place on the paper by the Dairy Instructor on dairy cattle. Some members were of opinion that the first consideration of the dairyman should be to breed cows that give the best milk returns, irrespective of their value to the butcher, while others thought that they should go in for a class that could be fattened off for the butcher if they do not turn out well or if anything goes wrong with the teats, as their best cows were liable to. Mr. Watson considered a great deal of the loss through bad teats could be prevented by paying more attention to the

cows, especially by milking them before calving. Mr. Murray's cure for milk fever was referred to. Mr. Mitchell said bleeding was a good remedy if resorted to in time, and stinting the cow in food before calving was a preventive. It was decided to consider Mr. Thomson's article at next meeting.

CODLIN MOTH.—Mr. Watson drew attention to the spread of codlin moth in the district, and to the fact that there was no adequate inspection of orchards to enforce the regulations. It was decided to bring the matter before the Central Bureau with the view to securing efficient inspection and the destruction of the pest.

FOWL TICK.—Mr. Wedd said this pest was very prevalent around Adelaide, and breeders should exercise great care, otherwise it would be brought into this district. He thought the introduction of birds from there should be stopped. Mr. Watson thought the danger of introducing the pest would be lessened by warning local poultry-breeders of its existence and the necessity for caution. It would be better for them to get sittings of eggs rather than live birds. It was decided to suggest to the Central Bureau that fowls sent from the city to the country should be inspected. [Unfortunately this pest exists outside Adelaide and suburbs, and as there is no power to carry out the suggestion breeders must rely on their own efforts to keep it out.—GEN. SEC.]

BOT FLY.—Mr. Wedd mentioned that the bot fly was now prevalent in the Western District of Victoria. It had been seen at Casterton. If it had not already done so it would soon cross the border. The fly deposited its eggs on the long hairs under the jaws of horses or on the long hairs of the fetlocks. They thus either dropped into the food of the horse or were licked off the fetlocks. The eggs, when swallowed, hatched in the stomach of the horse; the grub then attached itself to the membranes and ate its way through, eventually causing death. Stable-fed horses were more likely to be attacked than horses running out. He recommended the removal of long hairs along the cheeks, and the use of kerosine should there be a deposit of eggs.

GRUBS.—The prevalence of grubs in the soil this season was referred to. The Chairman said they had attacked and destroyed his mangold crop. It appeared from other statements that they were to be found everywhere—among potatoes, onions, grass fields, and in the flower gardens. The Chairman had tried lime as a cure, others had tried sheep dip, and some fowls and ducks. Magpies were said to be good grub-eaters. [Has anyone tried the Paris green, bran, and treacle remedy, which has proved so successful in destroying similar insects?—GEN. SEC.]

Cherry Gardens, January 10.

Present—Messrs. R. Gibbins (Chairman), F. Jacobs, C. Lewis, J. Nicholls, J. Lewis, J. Choate, G. Hicks, and C. Ricks (Hon. Sec.).

BRANCH SHOW.—Business in connection with the forthcoming show of the products of the district occupied the whole of the evening.

Strathalbyn, January 16.

Present—Messrs. M. Rankine (Chairman), G. Sissons, R. Watt, D. Gooch, W. M. Rankine, E. R. Morgan, A. Rankine, H. H. Butler, B. Smith, and J. Cheriton (Hon. Sec.).

TUBERCULOSIS.—After a long discussion on this subject it was resolved that the members do their utmost to assist the local health board in detecting the disease should it occur in the district.

MANURING.—Mr. Morgan stated that at Watalunga his barley went 15bush. per acre, besides which quite 5bush. per acre was knocked out by the severe hailstorms. His wheat gave 14bush. to 16bush., and hay 1 ton per acre. These crops were manured with commercial fertilisers, and he was quite convinced that his outlay in this direction had been very profitable. He believed a heavier dressing (say 2cwts. per acre) would pay better on his land. He favored English super., sulphate of ammonia, kainit, and potash. Mr. Morgan tendered his resignation, owing to his leaving the district. Members regretted the loss of so useful a member.

OATS.—Mr. A. Rankine tabled head of oats found in a wheat crop. It promised to be an exceedingly prolific variety, but none of the members knew its name.

SOUTHERN CONFERENCE.—It was decided that the Seventh Annual Conference of the Southern Branches be held at Strathalbyn, on Friday, March 24.

Crystal Brook, January 21.

Present—Messrs. G. Davidson (Chairman), W. J. Venning, J. C. Symons, W. Natt, and G. Meill (Hon. Sec.).

JUDGING STOCK.—Considerable discussion took place on the question of judging entire horses at agricultural shows, and it was decided to bring the matter forward at the Gladstone Conference.

FLORIDA VELVET BEAN.—The Hon. Secretary reported that several plants of this bean came up, and are still growing slowly. They appear to stand the weather well, and with water, he believed, would do well.

Carrieton, January 12.

Present—Messrs. W. J. Gleeson (Chairman), R. Fuller, M. Manning, J. F. Fisher, A. Steinke, J. B. Harrington, G. Martin, F. Kaerger, and J. W. Bock (Hon. Sec.).

SEASON.—The Hon. Secretary tabled report on past season. Although the season opened late, up to the middle of September there was a promise of from 4bush. to 8bush. per acre for the district. The severe weather during September and October shattered their hopes, and the failure was so complete that not more than 1bush. per acre would be averaged throughout the district. The weeds known as "pigs' face" (a kind of saltbush), native cress, and another with a yellow flower had helped to cause this result. Bunt had also been very prevalent. Mr. Harrington stated that owing to the weather and the weeds in the crop his average from 1,900 acres was only about three-quarters of a bushel. Mr. Manning said in his neighborhood and round Eurelia the crops did not strip nearly as well as was expected, and he attributed this result mainly to frost in October. Mr. Fuller also put the failure down to frost. The Chairman found the early varieties, such as Steinwedel and Early Para, yielded best, the latter being the better of the two, owing to its holding the grain better; it is also better for the reaper. He advised all farmers to sow as much as possible of the early wheats. The prevalence of bunt was, he believed, due to the inferior nature of much of the bluestone used for pickling. Some of the colonial bluestone appears to contain very little sulphate of copper compared with the imported article, for while the latter coated the steel shovels with copper the former did not. Where he used the English bluestone his crop was clean, but where seed pickled with the colonial article was sown the crop was very dirty. The Hon. Secretary had refused

some bluestone as inferior and bought the other kind and got clean crops. It was decided to ask the Central Bureau whether arsenic would injure seed wheat, and if not, would it be of any use for pickling in place of bluestone. [Arsenic could not be used with safety in place of bluestone.—GEN. SEC.]

GRISTING.—Mr. Fisher read correspondence *re* farmers having their own wheat gristed. Members agreed that it would be to their advantage to do so.

CORNSACKS.—Considerable discussion took place on the price of cornsacks. All the farmers are indignant at the merchants charging 5d. per sack and then purchasing them as wheat, which, at 2s. 6d. per bushel, comes to about 1d. As the price offering at Carrieton for wheat is only 2s., the merchants rob the farmer of over 4d. on every bag of wheat they purchase.

Balaklava, January 14.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, W. Smith, J. Vivian, E. Roberts, A. Manley, G. Reid, W. H. Thompson, A. W. Robinson, P. Anderson, and E. M. Sage (Hon. Sec.).

STANDARD BUSHEL.—The Hon. Secretary reported that the Chamber of Commerce had written to him for sample of this season's wheat, but as any wheat not up to last year's standard was to be excluded he had not sent any, as he considered it unfair to reject all wheat under 62lbs. per bushel when fixing the standard. Other members agreed.

CEREAL EXPERIMENTS.—Mr. Robinson tabled a nice collection of wheats in the straw, and gave an interesting description of the different varieties. Mr. Sage reported as follows on his experiments:—Golden Giant Side oats and Banner oats were too late for this district, being quite a month later than Algerian. Preston Spring wheat was a bearded variety, which grew well, but shed very badly. Champion Beardless barley had done well, was very early, but rather weak in the straw, sometimes breaking half-way down. It was sown on May 3^d, and was out in head in the first week in September. Some of the heads got cut by frost at the end of September.

Minlaton, January 21.

Present—Messrs. H. Boundy (Chairman), S. Vanstone, J. H. Ford, R. Higgins, W. Correll, D. G. Teichelmann, M. Twartz, J. Anderson, and Jos. Correll (Hon. Sec.).

AGRONOMY CLASSES IN STATE SCHOOLS.—Mr. Higgins advocated the teaching of the principles of agronomy in the State schools where required. It would be much better if such teaching was given to the sons of farmers than some subjects which were really of no value to them in after life. They had a teacher at Minlaton competent, and he believed willing, to take up this work and form an agronomy class if approved by his department. He moved—“That this Branch requests the Hon. Minister of Agriculture and Education to arrange for a good system of agriculture being taught in the Minlaton public school.” Carried unanimously.

MANURING.—Considerable discussion on the use of fertilisers took place, and on the newly-amended Fertilisers Act. Members generally were satisfied with the results from past harvest. One member averaged over 21bush. off 61 acres, another averaged 11bush. over a much larger area, and another had over 18bush. from some of his land; one got 183 bags off 60 acres without any manure other than wood ashes. Mr. W. Correll thought these returns proved that it was not necessary to apply much heavier quantities of manure than they

were doing. He did not favor putting on as much as 2cwts. when such results were obtained from half that quantity. It was important that the land should be well prepared, brought to a fine tilth, and sown at the best time, according to the season. It would pay better to put in less land and work it better.

EXPERIMENTS.—Messrs. Coirell reported as follows on experiments conducted by them during the past season:—Budd's Rust-resistant wheat, grown for second time, yielded 16bush. per acre, the grain being small, but of fine quality, very plump and shotty. The plants stood exceedingly well, but are not very robust at first. Plot was sown on July 11. Would probably be better to put this variety in earlier. Preston wheat (bearded) somewhat shrivelled and unattractive grain, flinty, stands well, and grows fairly quick, but is scarcely worthy of further trial. Mennonite, Banner, and Golden Giant Side oats very late, and not suitable for this climate. Danish Island oats (second season) appear to be almost identical with Cape oats, though much superior to the average sample obtainable here. A very promising variety. Champion Beardless barley looked splendid until ripe, when almost all the grain shed, in consequence of which it may be considered worthless. Florida Velvet bean and True Tagosaste plants destroyed by grubs. Bullock Heart cabbage, a very valuable variety. At first they were very leafy, and appeared worthless, but kept growing slowly and formed a very solid heart. They cook as well as the common varieties, and for fowls they should be specially valuable for summer feed. The special point in their favor is that they come in when the other winter varieties have all died or gone to seed. This variety has not yet seeded. Muriate of Potash.—While we cannot say potash is not required by our land for wheat-growing, this manure does not give anything near so marked results as phosphates.

Port Germein, January 21.

Present—Messrs. P. Hillam (in chair), W. Broadbear, E. McHugh, A. H. Thomas, A. Thomson, W. Crettenden, D. Thomson, H. H. Glasson, G. Stone, and H. Gluyas (Hon. Sec.).

MEMBERSHIP AND OFFICERS—Mr. Gluyas tendered his resignation as Hon. Secretary and member, as he was leaving the district. Members regretted the loss of the Hon. Secretary, and accorded him a vote of thanks for his services. Mr. A. H. Thomas was appointed Hon. Secretary.

Mylor, January 14.

Present—Messrs. S. W. Jackman (Chairman), W. H. Hughes, F. Rosser, R. Mundy, T. Mundy, E. Wilson, F. G. Wilson, W. T. Elliott, W. G. Clough (Hon. Sec.), and three visitors.

CODLIN MOTH.—It was decided to arrange for lecture by Mr. George Monks on this subject on February 4.

LIME AS A REMEDY AGAINST FROST.—The Hon. Secretary reported that he read in an American paper that powdered quicklime applied to plants touched by frost would prevent any injury resulting therefrom. He therefore obtained some marble lime, hung it in a bag in a shed until it fell to powder, but was still quick. Early in the morning, while some potato plants were quite white with frost, he dusted them over with lime, putting it in a brian bag for the purpose. Before he had gone far he noticed vapor rising from the plants as the lime took in water and gave out heat. The potatoes so treated received no damage, while others not treated were cut down by the frost.

Craddock, January 21.

Present—Messrs. R. Ruddock (Chairman), J. Ramsay, J. Turner, B. Garnet J. H. Iredell, J. Clarke, J. H. Lindo (Hon. Sec.), and seven visitors.

STANDARD WEIGHT OF WHEAT.—A standard sample of wheat was received from the Chamber of Commerce. Members considered 63lbs. per bushel too high for this season.

DEPTH TO SOW.—Mr. Garnet initiated a discussion on proper depth to sow wheat. Three-quarters of an inch was the minimum depth wheat should be sown, and 1½ in. the maximum depth. More mistakes were made in sowing too shallow than too deep. It was a mistake to harrow before sowing broadcast, as it made a smooth seed bed, and all the harrowing afterwards will not cover the seed to a proper depth. On limestone ground, or soil liable to set hard or cake, he considered 1 in. a suitable depth to sow, and on looser ground 1½ in. In preparing the land for sowing the plough was the best implement. If fallow land required working over first to kill the weeds use a light multi-furrow plough. He considered the scarifiers unsatisfactory implements, and would like to see them banished from South Australia. They level the ground too much, and then a hard crust forms on top. Ploughs should have the mould boards set to throw the furrows in high ridges or combs, as the seed would then have a good seed bed between the combs. Drilling in the seed was better than broadcasting, as it made a seed bed, put the seed at any depth required, and covered it properly. He was not afraid of shallow-sown wheat failing owing to starting through light rains and dying off again. He had known the process repeated three times and the crop be all right. Wheat at ¾ in. will stool better than if sown 2 in. to 3 in. deep, and more rain was required to cause it to grow if sown so deep. He did not believe in cross harrowing after sowing, but would prefer leaving the wheat in the hollows between the furrows, where it had a good seed bed and got more benefit from the rain. Cross harrowing levelled the ground so that the water ran off, but harrowing lengthwise left the ground in rough ridges, which held the water until absorbed. Mr. Ramsay considered 2 in. about the best depth to sow. If there was not sufficient rain to bring the crop to maturity at that depth it would not be sufficient if the seed was only put in ¾ in. deep. He thought the man who did not cross harrow after sowing broadcast was no farmer. Mr. Basham did not believe in a smooth seed bed, and liked to put the seed in at depth to meet individual circumstances, which vary a great deal. The Chairman thought 1½ in. the proper depth to sow wheat. He did not believe in scarifying anything but fallow. He objected to a smooth seed bed, and also to harrowing lengthwise. Once harrowing across was sufficient

Renmark, December 27.

Present—Messrs. W. H. Waters (Chairman), W. H. Harrison, R. Kelly, H. Fetch, H. Swiney, F. S. Wyllie, and E. Taylor (Hon. Sec.).

ONIONS.—Mr. Harrison tabled sample of onions, a hybrid between the Giant Rocca onion and shallot. The seed from these produced onions in clumps, the sample shown containing six and weighing just over 2lbs.

WINE-MAKING.—Mr. Harrison also tabled bottle of wine made from Shiraz grapes, and gave some useful information on wine-making. He was of opinion that the members could manufacture for home use at little outlay a good wholesome wine.

LOCATION OF BRANCHES.—Members suggested that a rough sketch of the colony showing location of Branches should be published in the *Journal* to make the Branch reports of more value. They read of the trial of various plants, experiments in cultivation, &c., by members of different Branches, and

if sure of the location and climate of the different places they would be better able to judge as to whether they could expect similar results in their own locality. [Funds will not permit of this being done at present. The matter is in hand, and only waiting an opportunity to carry it out. In the meantime, the publication in each issue of the *Journal* of the names of the Branches, location, and average rainfall will give much of the information desired.—**GEN. SEC.**]

Gladstone, January 7.

Present—Messrs. J. King (Chairman), J. Tonkin, E. Coe, J. Brayley, J. H. Rundle, W. A. Wornum, J. Shepard, J. Gallasch, and J. Milne (Hon. Sec.).

HARVEST.—Considerable discussion took place on the yields of wheat and hay for the past season. It was agreed that the hundreds of Yanga, Bunda-leer, and part of Booyoolie would average 7bush. of wheat and 1 ton of hay.

CONFERENCE.—It was decided to make all necessary arrangements for the Conference of Northern Branches, to be held at Gladstone on February 17.

Meningie, January 21.

Present—Messrs. M. Linn (Chairman), J. Williams, W. J. Botten, W. Trosser, T. W. R. Hiscock, W. Tiller, H. B. Hackett (Hon. Sec.), and one visitor.

DAIRYING.—Considerable discussion took place on Mr. Hackett's paper on "Best Cow for Dairy Purposes." Mr. Tiller favored the Shorthorn, and if any cross was required would use an Ayrshire bull. He found the Jerseys unsuitable, as those that failed as milk producers were of little value for beef. He believed that in milking contests the Shorthorns had taken more first prizes than any other breed. Any deficiency in the quality of the milk was more than made up in the quantity, and surplus stock always fetch much better prices than the smaller breeds. Mr. Hackett thought the Shorthorn the best all-round beast, but they had to take pasture and climate into consideration; hence his reason for not advocating a breed of too large a frame. Other members agreed, and it was resolved that the milking strain of Shorthorns is the best for general dairy purposes.

TUBERCULOSIS.—Mr. Williams' paper on stamping out this disease from their herds was discussed at length. Members thought an association formed to raise funds with which to pay compensation for diseased animals would be a good thing, but there were so many difficulties in the way of carrying it out that they would be taking rather too much responsibility upon themselves in forming such an association. It was thought, however, that the Branch could help to purge the herds of this complaint by reporting all cases of infection to the local authorities, and a motion pledging the Branch to this action was carried.

Clarendon, January 12.

Present—Messrs. A. Harper (Chairman), J. Juers, J. Piggott, R. Hilton, D. Thomson, J. Spencer, A. A. Harper, J. Wright, and A. L. Morphett (Hon. Sec.).

PRUNING.—It was decided to arrange for a pruning demonstration by the Inspector of Fruit next month.

OFFICERS.—Mr. J. Spencer was elected Chairman and Mr. A. L. Morphett re-elected Hon. Secretary for ensuing year.

Auburn, January 26.

Present—Messrs. W. R. Klau (Chairman), E. M. Dudley, J. B. Schober, G. R. Lambert, J. Ford, J. E. Isaacson, P. Cornwall, and Dr. Yeatman (Hon. Sec.).

STARLINGS.—Members reported rapid increase in number of starlings during past two years. The birds are doing serious mischief in the vineyard, especially amongst the Zante currants, and promise to be a greater nuisance and more difficult to deal with than sparrows.

HEALTH ACT.—Some discussion took place on the new Health Act in its probable relations to tuberculosis amongst dairy cattle.

THE TUBERCULIN TEST FOR TUBERCULOSIS IN CATTLE. — Dr. Yeatman read the following paper:—

In considering the various subjects that might prove of agricultural interest, it has occurred to me that a *résumé* of the latest records of the tuberculin test, for consumption or tuberculous organs other than the lungs, applied to cattle might be interesting. This test, the result of Dr. Koch's labors and research, has long passed the experimental stage, and for the last seven years, since Guttman, of Dorpat, published in 1891 an account of the results he had obtained, has been recognised as being based on scientific facts. The universal diffusion of tuberculosis, dependent on a living germ which can be cultivated and demonstrated outside the body (the tubercle bacillus) has been shown to have reached an extent which has not, until quite lately, been suspected. There must be few of us indeed who from a knowledge of the history of our own families do not feel a direct personal interest in anything that relates to the prevention of consumption. Now, drinking milk and, less certainly, eating the flesh of diseased animals, although a minor form, is nevertheless a very real one, of infection. It is of some importance to the farmer from a business point of view, because by introducing a tuberculous bull into his herd some of the latter may become directly infected, while the constitutional power of the produce is less able to resist the disease when exposed to it.

In purchasing any pure-bred or high-priced animals without first ascertaining that they are sound would seem in the light of our present knowledge an unnecessarily risky thing to do, and I believe that in time such cattle will be sold subject to a warranty that they successfully pass the tuberculin test within three days.

The importance of the test consists in the fact that it will disclose the presence of tuberculosis long before there are any external symptoms of disease. The injection of the tuberculin beneath the skin is always followed by a definite reaction or rise of temperature within eighteen hours if the animal is tuberculous. If only a slight reaction occurs the case may appear to be suspicious, and the test should be repeated in a week's time. The animal, from some inherent peculiarity, may be more than usually tolerant of the tuberculin, and it may be necessary to inject a larger dose. It is necessary to wait a week in order to do so, because the first dose will have established a tolerance, and time must be allowed for it to pass away. Before describing the mode of injection I must first explain what is meant by temperature and reaction.

A man's internal temperature remains during health remarkably constant, and never varies much whatever his external surroundings, from 98½° F. The bovine temperature is not by any means so constant, and may rise or fall at different times in the twenty-four hours, and with various trifling circumstances. It is necessary, then, first to find out what the normal mean temperature of the particular animal to be tested is in order to decide whether the temperature after the injection is higher or lower than it ought to be. It is also somewhat different in various parts of the body, and to get more uniform results it is recommended that the thermometer used should be secured by a string and completely introduced into the rectum till out of sight. This will be for 4 in. or 5 in. according to the length of the instrument. The average temperature of adult oxen is 101.5°; that of calves, 102.3°. Any disturbance or worry, a strange place, a change of weather, trifling indigestion, a draught of cold water may alter it from as much as 2°, so that it is evident how necessary it is to procure the datum of temperature of each particular beast before submitting it to experiment. Then the reaction, temperature, or rise after the injection can be measured from the highest reading of the thermometer taken beforehand. The hours of highest temperature are at 9 a.m. and at 4 p.m.; so these are the hours which should be selected, and it is also as well to take it about three hours after the first or at noon.

Having decided on the mean temperature the tuberculin may be injected, and if followed by no reaction the animal is proved to be sound, but if a rise of 2.5° occurs within eighteen hours it is tuberculous.

This rise usually takes place about the ninth hour after the injection. It may occur an hour or two earlier, but as it persists for some time there is no object in being in any hurry, and time and trouble may be saved by waiting till the ninth hour.

When the animal is far advanced in consumption the reaction is far less marked than when the disease is in an incipient stage.

This makes the test all the more valuable, because when a beast is obviously diseased it is unnecessary to apply a test to prove it, but when the mischief is limited to a few tuberculous glands it may be quite impossible to recognise it, and even an examination after death by a person unaccustomed to such work may fail to disclose the seat of the disease.

The tuberculin can now be readily procured from Sydney, and the price of each dose varies with the source of supply from 1s. 8d. to 4d. for each injection.* It is therefore not by any means an expensive preparation. It may be injected with an ordinary hypodermic syringe, but it is as well to connect the needle with a short joint of indiarubber tubing to ensure its safety in case the animal should move on feeling the prick of the injection.

All these measures described, I dare say, sound a little complicated, but they are in reality simplicity itself, and after seeing it once done no one would have the slightest difficulty in conducting the experiment himself.

If anyone in the district was thinking of purchasing any pure stock or animal which from some cause or other he might wish to test, I should be very pleased to give him a practical lesson in the introduction and reading of the thermometer, and the method of injecting, the fluid under the skin.

The Board of Health of New South Wales has published a list of rules to be observed in applying the tuberculin test, with which I will close the foregoing remarks:—

1. Animals should be confined during testing, and the natural temperature should not be taken till they have become cool and quiet after being first confined.

2. Animals under test should be allowed to drink only immediately after taking their temperature, and not within an hour at least before taking it.

3. The temperature must be taken in the rectum. A string should be attached to the thermometer and held; the thermometer being about 6in. long should be introduced until its extremity is only just visible; it should remain in five minutes by the watch; it should be withdrawn horizontally and read while still in that position; the reading should be written down at the same time. Lastly, the thermometer should be cleaned and the mercury shaken down below 98° before replacing it in its case.

4. The natural temperature of the animal to be tested must be taken during the day time, before the injection is made at night. It should be taken three times—at 9 a.m., at 12, and at 5 p.m.

5. It is convenient to inject the tuberculin late in the evening, or between 9 and 10 o'clock, so that observation of the reaction temperature may be begun early next day.

6. No attempt need be made to ascertain the reaction temperature before the ninth hour after injection.

7. The highest natural temperature observed before injection is to be taken as the datum for comparison with the reaction temperature.

8. No reaction temperature is to be regarded as decisive of tuberculosis which does not exceed the datum temperature by 2½° F. at least.

9. Animals suffering from advanced tuberculosis are liable not to give a marked temperature reaction, or if they are already feverish the reaction may not be noticeable; consequently, when the disease can be diagnosed with reasonable certainty by ordinary inspection the tuberculin test should not be applied.

10. Animals suffering slightly from tuberculosis sometimes give a marked reaction temperature. In cases in which a marked temperature reaction has been observed, and no diseased place is detected when the animal is first examined after slaughter, further and more careful search must be made. If a spot of disease is at last found which yet cannot be identified as tuberculous by its appearance, it should be cut out, placed in spirit, and transmitted to the board's laboratory for microscopical examination.

Mount Remarkable, January 26.

Present—Messrs. H. B. Ewen's (Chairman), A. Mitchell, W. Girdham, G. Yates, W. Lange, C. E. Jorgensen, H. Humphris, J. B. Murrell, D. Roper, T. H. Cassey (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year twelve meetings had been held, with an average attendance of eight members. Besides three papers by members a number of practical matters had been discussed. A lecture by Professor Lowrie on "Manures" was much appreciated by the residents. Some of the seeds sent by Central

* Messrs. Burroughs, Wellcome, & Co., in 1 c.c. tubes at 1s. each; sufficient for three injections.

Bureau had done fairly well considering the season. Yellow Tankard turnip, Imperial tomato, All-the-Year-Round cabbage, and Dart's Imperial wheat had done well in most cases. Exhibits of Dart's Imperial wheat, a cucumber 16in. long and 4lbs. in weight, and an onion from Innamincka, Cooper's Creek, weighing 14½ozs. were tabled by different members. Mr. A. Mitchell was elected Chairman, and Mr. T. Casley re-elected Hon. Secretary for ensuing year.

Pyap, January 24.

Present—Messrs. W. Axon (Chairman), J. Holt, J. Harrington, A. J. Brocklehurst, T. Smith, E. Robinson, J. Bowes, W. C. Rodgers (Hon. Sec.), and one visitor.

FLORIDA VELVET BEANS.—Members reported these to be a comparative failure, being unable to stand the hot winds. A few plants in sheltered positions continue to exist.

CROWS.—Members reported that crows had done more damage than any other birds in the district. Three acres of maize have been ruined by the crows, the seeds being stripped from the stalks before mature. Apricots and melons and other vegetables have also been raided. In the opinion of the members crows are a pest, and should be summarily dealt with, being the greatest nuisance on the river.

POTATOES.—A discussion took place on planting and treatment of potatoes.

Quorn, January 28.

Present—Messrs. James Cook (Chairman), John Cook, G. Altmann, C. Patten, W. Toll, G. Baker, and A. F. Noll (Hon. Sec.).

JERSEY BULL.—The Hon. Secretary reported that the departmental bull was thriving and being freely availed of by settlers. The charge was alike to all, but members of the Branch had the preference in case of too many calls on his services.

BEARDED CHAFF.—In answer to a question, Mr. John Cook said chaff of bearded wheat was not injurious. The seeds of silver grass and barley grass caused sore mouths of horses and cattle, but bearded wheat chaff generally got the blame. He found that the stock preferred bearded cocky chaff to any other.

RABBIT POISONING.—Mr. G. Altmann directed attention to Mr. Mills' (Kamantoo Branch) successful poisoning of rabbits by adding thirty to forty drops aniseed oil to the formula for phosphorised pollard. He thought this was a great improvement. The Chairman strongly recommended members to read the reports in the *Journal of Agriculture*, and to bring forward any matters they wished to discuss at the meetings of the Branch.

Port Pirie, January 24.

Present—Messrs. G. Robertson (Chairman), R. F. Humphris, G. M. Wright, T. Gumbrell, P. J. Spain, A. Wilson, J. Lawrie, G. Hannan, W. Smith W. K. Mallyen, and R. J. Ferry (Hon. Sec.).

OFFICERS.—Mr. P. J. Spain was appointed Chairman, and the Hon. Secretary was re-elected.

CONFERENCES.—Notifications of Branch Conferences, to be holden at Bute on February 8, and Gladstone on February 17, were received, and some members promised to be present.

ENSILAGE.—Mr. W. Smith tabled two samples of ensilage, which he stated greatly increased and enriched the milk of cows fed upon it. One sample was made from green wheat, and the other from weeds and rubbish. He considered the latter nearly as good as the former, both being sweet and readily eaten by cattle, though both samples were rather over-heated. Mr. Robertson had made sour ensilage with great success, and said it mattered very little to stock whether sour or sweet.

BEST VARIETY OF WHEAT.—At next meeting members proposed to discuss the question "Which is the best variety of wheat to grow in this district?"

Burra, January 27.

Present—Messrs. F. A. S. Field (Chairman), James Scott, Joseph Flower, G. Goodridge, F. Duldig, W. Heinrich, W. G. Hawkes, Hon. John Lewis, M.L.C., and Mr. R. M. Harvey (Hon. Sec.).

FERTILISERS.—The Chairman stated that last season he drilled in his wheat, together with Thomas phosphate—about 87lbs. per acre on the best soil and 130lbs. on the poor land. The rainfall was 17in., and the highly satisfactory result of four bags to the acre was realised. At World's End the rainfall was only 8½in., and the results were not satisfactory. In most cases in this district the results of drilling fertilisers with the seed wheat were decidedly successful. Some of the crops gave as high as 20bush. per acre, but the rainfall for the year was below average.

Hahndorf, January 28.

Present—Messrs. F. H. Sonnemann (Chairman), C. Jaensch, A. J. Paech, C. Bom, T. Grivell, G. Sandow, H. Spohr, J. C. Rundle, D. J. Byard (Hon. Sec.), and one visitor.

CROPS.—Only small areas in this district were cultivated last season for grain; but these in most cases gave good returns. In one instance a farmer claimed that he had reaped 40bush. per acre off forty acres. It was generally agreed that the average of the district was not less than 20bush. The hay crop was a very good one—anything under 1 ton being exceptional. The favorite varieties of wheat were Purple Straw for grain and Tuscan for hay. Hardly any other cereals than wheat are grown in this district, except for green feed.

Brinkworth, January 20.

Present—Messrs. R. Cooper (Chairman), J. Graham, J. F. Everett, A. W. Morrison, H. Cornish, A. J. McEwin, C. Ottens, W. Wundke, S. Aunger, H. Bastian, J. Stott (Hon. Sec.), and two visitors.

FATTENING SHEEP.—Members do not consider the suggestion practicable, as made by Inkerman Branch, *re* fattening sheep for the butcher by use of wheat.

EXHIBITS.—Mr. C. Ottens tabled two sorts of cucumbers grown from Bureau seed. These were very fine, one measuring 9in. long by 2½in. diameter. The plants were attacked by a species of aphid a few days previously. [Spray with tobacco and soap decoction, made by boiling 2ozs. tobacco and 4ozs. soap in 1gall. water.—GEN. SEC.]

TRIAL OF DRILLS.—Members decided to hold a field trial with seed drills about February 23.

EXPERIMENTS.—Messrs. Cooper and Everett reported favorably on Dart's Imperial wheat. Mr. Ottens said this wheat, sown end of May on sandy clay soil, stood well at first, but blighted considerably later on, owing to hot winds; Golden Return, sowed same time in similar soil, grew well, but the grain was much pinched by hot winds; Trooper barley, sown same time, was small in grain, but he believes it is a good variety. He thinks oats are unsuitable in this part because it is too late.

Nantawarra, January 26.

Present—Messrs. C. Belling (Chairman), S. Sleep, E. J. Herbert, Jas. Nicholls, E. J. Pridham, R. Nicholls, and T. Dixon (Hon. Sec.).

BUNT.—Mr. Jas. Nicholls read a paper on "Bunt." [An article by the Editor upon "Bunt and Smut," written prior to receipt of this report, appears in another portion of the present issue, and as it practically covers all the points touched upon by Mr. Nicholls it is not necessary to print his paper.—GEN. SEC.] An instructive discussion ensued.

Pine Forest, January 17.

Present—Messrs. W. H. Jettner (Chairman), D. F. Kennedy, E. Masters, A. Inkster, J. Muller, R. Barr, jun. (Hon. Sec.), and two visitors.

CONFERENCE OF BRANCHES.—The Hon. Secretary reported that circulars had been sent to thirteen adjacent Branches, requesting their co-operation in holding a Conference, but up to present date no response had been made. In consequence, it was resolved to abandon the attempt for the present.

DRILLED MANURES AND SEED.—The consensus of opinion of members was that the yield of wheat in this district was increased by 100 to 200 per cent. through drilling in English superphosphate with the seed. It was agreed that the estimate of 4bush. per acre, given at the previous meeting, has been exceeded by 1bush. per acre.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Conciliation and Arbitration in Trade Disputes.

In the November issue of the *Law Magazine and Review* Sir Edward Fry discusses the question of conciliation and arbitration in trade disputes, and in view of his recent experience as conciliator in connection with the South Wales coal strike his remarks will be read with interest. After reviewing the history of legislation on trades since the time of Edward III., Sir Edward Fry comes to the consideration of the Conciliation Act now in force. He says:—

“The Act in the first place provides for the registration of boards of conciliation; but these boards practically derive all their powers from the consent of the parties, and owe little to legislation or registration. In the next place, the Board of Trade is, in the event of any dispute between employers and workmen, clothed with power to do four things—first, to direct an inquiry into the causes and circumstances of the difference; secondly, to facilitate the meeting of the parties in difference; thirdly, on the application of one of the parties in difference, to appoint a person or persons to act as a conciliator or as a board of conciliation; and fourthly, on the application of both parties, to appoint an arbitrator. With reference to the first power given by the statute, viz., to ‘inquire into the causes and circumstances of the difference,’ it is to be observed that the statute gives no judicial power to the inquirer and requires from him no public statement of the results of his inquiry or of his opinion on the merits of the controversy; he has no power to compel the attendance of witnesses or the production of documents, nor has he the power to administer an oath; and without such powers his investigation might well fail except when both parties desire the inquiry. It may be suggested that if one party gave evidence the other would be under a moral compulsion to do the same, but that appears to me far from certain. At the same time it must be admitted that to clothe the inquirer with the powers without which his inquiry may well fail would be to enable him to investigate the private affairs of men not desirous of disclosing them, and would probably be felt a serious interference with personal liberty.”

Referring to the powers of an arbitrator, Sir E. Fry remarks that “An arbitrator is a person long known to our law, but a conciliator is a new person, a new creation of the statute, and one turns with some interest to see how his duties are defined. The definition is, like many other passages in which the collective wisdom of Parliament is expressed, rather curious. ‘He shall,’ says the Act, ‘inquire into the causes and circumstances of the difference, by communication with the parties, and otherwise shall endeavor to bring about settlement of the difference.’ The notion that mere inquiry into the past history of the dispute is the main resource for conciliation seems to underlie this sentence—it is one of doubtful accuracy—but the following words are wide and general, and fortunately are unambiguous. The Act appears to draw a distinction between the ‘amicable settlement’ and the ‘settlement’ of a dispute—the one appears to refer to a termination by treaty or agreement, the other to include not only the amicable settlement but the settlement by surrender of the one party to the other. What the Legislature, therefore, seems to have meant by the sentence I have cited was that the conciliator should inquire into the circumstances and causes of the difference—that he should do

this, not by means of a regular formal inquiry with witnesses, but by communication with the parties, and that he should by all means in his power endeavor to bring about a settlement, whether by agreement or by the surrender of the one party to the demands of the other."

In conclusion, Sir Edward Fry expresses the opinion that the method from which most is to be hoped for in the future as a means of avoiding the terrible industrial struggles of strikes or lock-outs, is the development of voluntary councils of conciliation constituted of representatives of employers and employed with a recourse to arbitration in the last resort. In a conciliation Board so constituted as that a tie in votes is possible, and without some further provision for a decision, it is obvious, he says, that an attempt at conciliation may fail, and in that event nothing is left but an industrial war; in the event of an equal vote in the board of conciliation, and in that event only, it seems that masters and men may reasonably be asked to admit some form of arbitration. To this it may be replied that such an arbitration in such an event is open to all the evils attending on compulsory arbitration; and that a master may be compelled to carry on his works, and a man to give his labor, on terms which they respectively deem unjust. Sir E. Fry would avoid the difficulty by giving to each party to the arbitration a power after the award to determine the agreement by a short notice, and so to bring within narrow limits the evils to be feared. With this provision, the reference to arbitration gives an opportunity for fully threshing out the question in difference, and it gives a pause before war can be declared; and both these things are of high value. Sir E. Fry thinks that a reference to arbitration in the event of the failure of conciliation, and coupled with a power of speedily determining the agreement if the award be found unendurable, is better than an immediate recourse to industrial warfare.

In this conclusion the writer of the paper is greatly fortified by the successful working for many years past of the joint system of conciliation and arbitration in the manufactured iron and steel trade of the north of England. The rules of the board of conciliation and arbitration (revised up to January, 1895) declare the object of the board to be "to arbitrate on wages or any other matters affecting the respective interests of the employers or operatives, and by conciliatory means to interpose its influence to prevent disputes and put an end to any that may arise." Equal representation of the two sides is provided for. All questions are in the first instance referred to a standing committee, except "a general rise or fall of wages, or the selection of an arbitrator to be empowered to fix the same." This excepted question is reserved for the consideration of the whole board, at which the referee, who is a standing officer of the board, may be invited to preside. If no agreement be arrived at a single arbitrator (who may be the referee) is to be appointed, and his decision, at or after a special arbitration held for the purpose, is final and binding on all parties. The extent to which this system has worked may be learned from the fact that, up to the year 1890 the standing committee had arranged more than 850 questions, whilst arbitration had been resorted to in only eighteen instances. The fact that such a system has worked to mutual satisfaction and to the exclusion of all strikes and lockouts for a long series of years, appears to Sir Edward Fry to speak eloquently in favor of permitting arbitration when conciliation fails, even in the question of the future rates of wages.

The Patent Office.

The appointment of clerk in the office of the Commissioner of Patents has been filled by the appointment of Mr. Henry Charles Rainsford Batchelor, of the Customs Department, at a salary of £160 per annum, *vice* Gwynne, deceased.

Woman's Work and Wages.

BY AGNES A. MILNE, INSPECTOR.

Not to generosity, man's first impulse to woman, nor to justice, his highest act, but to passionless science must be credited the vastly extended area of the field of female employment which, during the latter half of the expiring century has profoundly changed her character, and promises to further complicate social conditions. And yet not alone to passionless science can be ascribed the emancipation of woman, when I read that nearly nineteen hundred years ago, the first commission ever given in this new era was given to a woman. And although she has been crushed and trampled under foot of men, yet to-day, by the power of the All-Good and science going hand in hand (for science after all is only the handmaid of the Great Ruler of the universe), there will rise up a noble band of women who in their turn will be wise to counsel and command.

It may appear that the social conditions of women seem to be more complicated than ever; yet we are hopeful, that by wise and judicious legislation, out of the chaos and complication, order, peace, and plenty will come. But we are now to take up the practical parts of "Woman's Work and Wages."

An article from *Advertiser*, 1898, states that, according to some interesting facts and figures, recently published by Lloyds concerning exploits of women, nearly four millions of American women are earning incomes as lawyers, authors, journalists, Government clerks, physicians, farmers, ministers of the gospel, and public school teachers. Many of these are receiving large salaries—from £400 to £700 per annum.

But while facts and figures such as the above are very gratifying, we have to acknowledge the fact that to-day there are thousands of women workers who are still held in the iron grasp of commercialism. Hence to-day we find her narrowed and cramped, while many a poor creature has to work long hours for a very small remuneration.

Still we trust there is a better day dawning, when such things as the following shall be a thing of the past:—The San Francisco *Examiner* says: "Fancy a young girl working from half-past 6 a.m. till 10 p.m. at night, and even later, exposed to the fumes of dirty suds containing the virulent and active microbes of a great city, covered with the poisonous vapors from the steam and hot work, standing in cold draughts from the passages, with only thirty minutes' respite, then to bed hungry and fagged; all for 7 dols. 50 cents per month. That is the case," says *Examiner*, "of 800 such in our city, and many of them have sickly mothers and little brothers and sisters dependent upon them for support."

But now shall we come a little nearer home; and as we write we say surely such a state of things could not exist in these lands of the Sunny South.

Inspector Kingsbury, in the *Age*, states that in one of the Victorian factories one girl machined forty pairs of uppers for a remuneration of 10s. 6d., while another turned out eighty pairs for 12s. 6d. He also states that apprentices were only receiving 2s. 6d. per week when they should have been receiving 5s.; and we have to admit the same thing obtains to-day in many industrial pursuits in our own province.

The Hon. W. A. Robinson, in an article to the *Advertiser* some time ago, wrote:—"There is a point which cannot be passed by the workers, and which can never be insisted upon by the capitalists, that is the starvation point, and this point has been reached in many instances (we do not say in all). And," says the writer, "we can go further and say, without fear of contradiction, that this semi-starvation system of payment for female industrial labor has been in existence for many years, notwithstanding the powerful appeals of reformers."

We have still with us to-day the bargain-hunters, who never trouble to ask themselves the question how much the worker receives for her share of the work in the bargain that is so cheap.

Therefore woman's emancipation is not yet complete, when it is known as a fact that numbers of women are working hard and long hours, and the most they can earn is from 7s. to 10s. per week.

Girls in Adelaide factories to-day are making men's tweed suits (dark serge) for 4s. the suit. Another woman, to keep her workroom going during slackness of her own work, took a line of tweed trousers to make, not knowing what she was to receive for same, and when taken home received the handsome sum of 7d. a pair (well made). She, paying her employes a fair day's wage for a fair day's work, had nothing whatever for her own labor.

Henry George says:—"Where wages are highest there will be the largest producers and the most equitable distribution of wealth. There will invention be most active, and the brain guide best the hand. There will be the greatest comfort and the widest diffusion of knowledge, the purest morals, and the truest patriotism."

May this soon be so in South Australia.

. Where, floating free
From mountain top to girdling sea,
A proud flag waves exultingly;
And freedom's sons the banner bear,
No *shackled slave* shall breathe the air—
Fairest of Britain's daughters fair—
Australia.

"The Lump of Labor."

Earl Grey, having been asked to address the Newcastle Economic Society on "Co-partnership in Labor"—a subject he has made especially his own—on a recent occasion, took the liberty of varying his theme for the purpose of exposing an industrial fallacy of very great practical vogue in British labor, the cure for which he believes to be found only in industrial co-partnership. The latter contention is at least controversial; but regarding the serious nature of the fallacy and the way in which it is crippling industrial progress in this country there can be no dispute. Based upon half knowledge—which is, we are told on classical authority, worse than complete ignorance—this idea that there is only a limited amount of labor to be done in every industry, and that the more a single man performs the less he will leave for his fellows, is, unfortunately, much favored by trades unionism at the present day. One of the curious features of the case, moreover, is that it is seldom frankly avowed; and that it may be openly denied, and yet found to be most assiduously propagated and acted upon all the same. Sometimes it has only been after prolonged and careful inquiry that employers have discovered the reason for the inveterate falling off in the amount of work done in their shops in the existence of a moot rule or understanding that a workman is not to exceed a certain limited rate of production, on pain of incurring the resentment of his shopmates. Earl Grey referred to several authentic and typical cases of a steady contraction of the output of labor in certain industries. There is probably scarcely an employer in the country, who has to do with any large number of men, who is not conscious of a similar tendency. It might at first sight be supposed that it is owing largely, if not mainly, to a growing impression that working men have in the past been exerting themselves too much, and that they can now afford to take matters more easy. But, in point of fact, there are trades and there are cases, which are well authenticated, in which there is actually no

saving of individual exertion in producing less than in producing more; and yet the tendency is all in favor of producing less. Besides, we do not believe that the British working man is growing more inert than he used to be. The reason lies deeper than is supposed. It is based on a persistent belief that the introduction of machinery for the purpose of saving labor is bad for the working man, and reduces the sum total of the wages which can be earned by the whole body of the operatives.

That is the fallacy; and Earl Grey not only pointed out in what it consists, but related a very clever American allegory, by way of more forcibly pointing the moral. He did not say, but it is a pertinent fact, that the lesson is being learned in the United States much more readily than in England. At this moment the "lump of labor" theory is certainly at a discount among the intelligent workmen of America and their trade organisations. The deliberate restriction of the output is far less common there than it is with us. Some recently introduced labor-saving machinery, of which the results are being carefully observed, are found to produce from 25 per. cent. to 30 per cent. more work in an American workshop than they do in this country. That is not because the trans-Atlantic workmen are more expert than the British, but because the latter are admittedly jealous of the introduction of the machines; and cannot so clearly see, as their American confreres do, that the effect must be to immensely increase the total amount of labor, and thus to give at one and the same time more employment and better wages. One can, of course, quite understand how the American mind—better trained to and accustomed to the idea of progress and unlimited expansion than it is in this country—should be more easily educated into the rejection of a shallow and mischievous fallacy. But it is not creditable to Englishmen that they should be so slow to learn a lesson so essential to the maintenance of the national prosperity and to the development and improvement of the status of the workmen themselves. When, however, Earl Grey goes on to say that he despairs of the lesson being learned and practised until we have industrial co-partnership, in place of the present system of employer and employed, we do not entirely concur. We cannot despair of our own workmen learning a lesson that is being rapidly learned in the United States.—without any particular spread of the system of industrial co-partnership. To that system we have no antagonism. We should be glad to see it extended, and that it should have every chance and every encouragement. But we cannot shut our eyes to the fact that it has great practical obstacles to encounter; and that it possesses other weaknesses and dangers that go far to modify its advantages. We know of experiments in industrial co-partnership, begun under very flourishing auspices, that have failed badly, and which, in their failure, exposed some of the frailties of human nature in marked degree. We have heard of a dead-level of industrial effort, calculated upon the capacity of the feeblest, creeping into workshops, and of discussions as to management taking the place of industrial labor. Then, of course, there is the infallible evidence of the profit and loss account; and, when these things are fairly considered, it cannot be truly said that in this country industrial co-partnership is yet a demonstrated success. If, then, we have to wait for the substitution of this system for that of employer and employed, in order to get rid of the lump of labor theory, our outlook is rather dark. We have better hopes for the future than these, however. We hail the advance of clearer views in the United States; and we believe that if those who have influence with the working classes in England would exert themselves to expose and to denounce the fallacy, it would in time be abandoned, first by the more intelligent, and then by all classes of workmen. What we have most to deprecate at the present moment is a sneaking fondness for it among those who would not undertake to support it in argument.—*Newcastle Journal*.

The Printing Trade—The Apprentice Question in Germany.

One of the favorite claims made against organised workmen is that they tend to deprive the youth of the land from learning trades. Anyone disposed to be candid will, on investigation, find that the limitation of apprentices which the unions aim to enforce is in no way a tyrannical effort of a would-be close corporation, but a move to give justice to the learner and to conserve the best interests of the trade. The union has nothing to fear from honest apprenticeship and thorough instruction, but it puts a barrier in the way of the dishonest hire of boys by employers who would debauch the trade. With that unerring view to first causes characteristic of our German fellow-craftsmen this matter is worked out by them in a fair and business-like way by a notification each year (about Easter time) to parents and guardians. The organisation—the German Printers' Guild—is made up of employers and journeymen, and their notification is signed by Mr. George W. Bürenstein as chairman of the employers, and by Mr. L. H. Gieseke as chairman for the journeymen. The published notice reads as follows:—"To the Parents and Guardians—The time approaches when boys leaving school are to learn trades yielding them incomes large enough for their own support, and enabling them in future years to build up a home and to fulfil their duties towards their families and society. To this end it is your imperative duty to put your boy under the care of such establishments as have the means of proper instruction, and where the character of the workshop in which the boy is to serve his time is in itself a recommendation for his future journeymanship. The former can be expected where the number of apprentices is in proper relation to that of the journeymen, and the latter where the employers are men of character and ability to instruct him. In workshops where the majority are apprentices it is merely the object to teach apprentices minor manipulations, so that a large profit is quickly made on their labor force, and the boys are then dismissed as unhappy botchers, thus being thrown into the world as outlawed persons, incapable of finding employment to earn their livelihood. In order to resist such a reprehensible course nearly all the German master and journeymen printers have formed a union and resolved that in future only such journeymen shall be employed as have served their time in printing offices which have recognised the common scale, in writing, on file at the office of the guild, and where the number of apprentices corresponds to the order of the above-mentioned common scale. It is therefore the paramount duty of parents and guardians desiring to put their boys in the printing trades to ascertain whether or not the selected master printer has recognised the common scale. If they do not mind this they most likely destroy all prospects of their wards ever getting employment in the German Empire. The officers of the printers' guild will see to it that this measure against unfair competition by abuse of apprentices is rigidly carried out, and parents and guardians are therefore warned to be careful with whom they apprentice their boys. Reliable information will be furnished free of charge by the Common Scale Office of the German Printers, Berlin, S.W., Friedrich Street, No. 240-241."—*Inland Printer* (America).

The State Board of Conciliation.

The State Board of Conciliation established under the authority of the Conciliation Act, 1894, now consists of the President (His Honor John George Russell, Commissioner of Insolvency and Special Magistrate), and the following members:—Messrs. George Henry Buttery, William Green, Samuel Joshua Jacobs, William Robertson, Alfred Mueller Simpson, and Joseph Thompson.

Alexander Buchanan, Esq., S.M., Master of the Supreme Court, is the Industrial Registrar: office, Supreme Court, Victoria Square, Adelaide.

Boot and Shoe Manufacture.

BY INSPECTOR BANNIGAN.

In and around the City of Adelaide 700 men, 115 boys, 290 women, and 36 girls are employed in 22 boot factories, and in smaller workshops the numbers are variously estimated at 100 to 150 males and 20 to 30 females. It will be noticed that these figures show a falling off in the number of men employed in factories as compared with a year or two ago, and a slight increase in the number of females and boys. This to a certain extent is traceable to the strike which occurred last year, and which opened the way for the introduction of further labor-saving machinery, and the women and boys having taken no part in the strike, their positions remained unaltered.

Most of the work in this line is now done by machinery, and enormous quantities of stock is yearly manufactured at comparatively low prices. A pair of ordinary boots are now procurable at about a third of what they cost some twenty odd years ago, but as living expenses have undergone very little change in that time the producing power of each individual worker has to be correspondingly increased in order to earn sufficient to live decently.

There are still many who cling to the use of the old hand-made boot, and claim that they get better value for their money on account of the comfort and increased wear to be got from this class of article; but very few tradesmen can now boast of a sufficiently remunerative connection to make the work pay.

The machines in use are among the most ingenious and intricate of modern invention, and it is marvellous to observe the human-like action of some of these steam bootmakers.

Among the most interesting is the screw and nail driving machines. The nails and screws are cut from long coils of metal of the required gauge, and driven into the leather sole to the necessary depth, and cut off smoothly at the surface by one stroke. In the case of the brass screw driving machine—one only of which is in this colony—the required length of screw is driven into the sole by a rapid revolving motion of the feed box, and is nipped off at the right moment to a nicety.

The Hungarian nailer is another ingenious piece of mechanism. The nails are thrown into a feed box, and by means of an inclined shoot they right themselves, point downwards, ready to be driven into their place, one at a time, as they reach the point of delivery.

The heeler is a machine of great strength, and none but smart intelligent men dare undertake to manipulate it. Unlike the other machines, this one is handfed. The long nails or brads used for securing the heels are placed in sliding holders by lads at either side, and these holders are so accurately arranged that when swung round over the perforated blocks the brads drop into their places ready to be driven home by the steel flat tipped teeth that are suspended over them. The heels are all ready in blocks, and the boot having been adjusted on the iron last, the operator, by the pressure of his foot on a lever, causes the driving teeth to descend through the perforated block, and with a crash the heel is secured. With another movement the surface pieces are forced down on the projecting ends of the brads and is then ready to receive the finishing touches from the other machines.

In all the best dressing machines, where the cutting down and smoothing is done, there is arranged a suction fan to draw off all dust that would otherwise float through the factory, and be breathed into the lungs of the workers. This is a matter that should receive the very greatest attention in factories and workshops of every description, as it is only too evident from a casual inspection of many such places that there is ample room for further efforts in the direction of ventilation.

From the cutting out machine till the boot receives its final touch up at the polishing machine dexterity of hand and accuracy of eye are essential, and, as remarked by one in the business recently, things are now cut so fine in the trade that employers cannot afford to lose either time or material, and every scrap of both are scrupulously used up.

It would come as a surprise to many ladies to know that their most elegantly finished shoes are made in the first instance inside out. The sole is placed inside and the upper sewn on, after which it is turned like a stocking and finished off, none the worse for its apparent rough handling.

The women and girls in factories are chiefly employed at the sewing machines, and as these are for the most part driven by steam power the work is not heavy. Against this, however, must be weighed the fatigue resulting from having to remain for many hours in a cramped sitting position without the relief to body and limbs afforded to those whose work allows them to move about freely.

With regard to the work turned out there is unfortunately a deep-seated prejudice in the minds of many against colonial-made boots—or colonial-made articles of any kind—which is dying very hard.

If people were to spend their money nearer home, for locally-made goods, they would stand a much better chance of re-earning it, and the pleasure of again spending it some other day.

Industrial Friendship.

It is never too late in the day to congratulate ourselves and the community generally upon the achievement of a great victory, and in these pages we confine ourselves to matters industrial. It will be readily admitted that the prospect in the mining industry of the United Kingdom is more satisfactory in the latter quarter of the year than it was a short time ago. Then the mining operations of South Wales were paralysed by a dispute which never should have commenced, and whose only result was a heavy loss to the colliery proprietor, the collier, and the nation. No section of the community, especially important industrial sections, should recklessly dislocate trade, and the miners of the United Kingdom should never enter upon a great contest without counting the cost, and with their coffers full.

Then, also, a cloud has arisen in a district very much more important even than South Wales, namely, the counties covered by what has come to be known as the Miners' Federation of Great Britain. Probably within that area is found one-half of the colliers of the United Kingdom. The circumstances were somewhat peculiar; a demand had been made for an advance of wages, and at a conference between the colliers and the proprietors the basis of an important agreement was prepared, and this basis the representatives of both workmen and employers approved.

Broadly, the provisions were, first, that wages should be advanced 2½ per cent. on October 1st: second, that for a period of two years, from the 1st of January, 1899, the wages should not be less than those prevailing in September, 1898, nor higher than 15 per cent. above; third, that during those two years and between these limits wages should be fixed by a conciliation board such as originated under the auspices of Lord Rosebery in 1893. The leaders on both sides being agreed, we all thought the matter was settled, but there's many a slip between the cup and the lip, and the colliers, chiefly of Lancashire and Yorkshire, took exception to the smallness of the advance to commence with, and reiterated their demand for 10 per cent., which the employers firmly refused.

We may say now that there was a danger of conflict, resulting in a prolonged stoppage of the collieries within the federation area, but, fortunately, common sense prevailed amongst the men, and statesmanship was in evidence amongst the leaders of the men. The leaders frankly and firmly advised the men to accept the agreement, including the $2\frac{1}{2}$ per cent. advance. Lancashire refused, but, fortunately, Yorkshire accepted, and the result was that conflict was averted and peace established.

During the unsettled period we offered no opinion as to the amount of the initial advance, because we felt very strongly that this was a matter in which outsiders ought not to interfere; we expressed our great approval of the treaty generally, and we reiterate that expression of approval now. On the one hand the colliers, who have insisted upon a minimum wage, which should not be less than that prevailing in September of this year, have established that minimum wage for the remainder of this century. They have also conceded a maximum beyond which their demands shall not go. On the other hand the employers not only know the extremes between which the wages may fluctuate, but they have the further assurance that there shall be no variation in wages except by the action of a conciliation board.

It is impossible to overestimate the importance of this agreement; it gives security to the proprietors and workmen and the country generally, and inevitably tends to the promotion and development of harmony and friendship between master and man.—*Science and Art of Mining.*



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NOTES AND COMMENTS.

“Does the application of phosphatic fertilisers impoverish the land?” was a straight question put to Professor W. Lowrie at the Conference of Northern Branches of the Agricultural Bureau at Gladstone on February 17. The Professor’s reply was equally direct, “No.” By adding phosphates where there is a deficiency of phosphoric acid in the soil, but not a lack of potash and nitrogen, you enable the soil to produce a full crop in place of a deficient crop, and naturally so much more potash and nitrogen is removed with that extra amount of grain. If the phosphatic manure were not applied the increased crop could not be produced, and therefore the extra potash and nitrogen would not be taken out of the soil. In time, through the use of phosphates and the production of heavier crops, the supplies of potash and nitrogen would, of course, be diminished, and then it would be necessary to apply manures containing those substances.

A farmer in the Yankalilla district reports having as a test sowed one bag of wheat on four acres of land last season, putting the seed and 1cwt. of super. per acre in with a seed and fertiliser drill. From this he obtained 23bush. per acre, against 12bush. from the rest of the paddock, sown broadcast and not manured. This shows a return of 11bush. per acre extra for an expenditure of about 5s. for the fertiliser.

Considerable confusion has been caused in the past by the different terms adopted by manure merchants in speaking of the constituents of their fertilisers. The value of purely phosphatic manures depends upon the percentage of phosphoric acid they contain, in combination with certain proportions of lime, and the less lime the more soluble is the phosphoric acid. In superphosphates there is only one part of lime to one part of phosphoric acid, but in bonedust and Thomas phosphate there are three and four parts respectively of lime to each part of phosphoric acid, hence the quicker action of the super. The new Fertilisers Act provides that the invoices of the manure merchant must show the constituents in each manure in a certain form, so that one will not sell super. as containing, say, 17 per cent. phosphoric acid, and another as containing 35 per cent. to 37 per cent. soluble phosphate. The seller has, with super., to guarantee the percentage of soluble phosphate, hence farmers can at once see which sells the best manure, and can readily compare prices.

Some misapprehension appears to exist as to the action of the Department of Agriculture in respect to the analyses of fertilisers. The Inspector of Fertilisers has received several samples from farmers who wished to have them analysed, and who believed the Department did this work free of charge. This, however, is not the case. If it were done perhaps fifty samples out of one shipment of a particular fertiliser might have to be tested, where only one is really necessary. The method adopted by the Inspector is to take samples from each shipment at the wharf or in the importer's store. These are thoroughly mixed and a sample, which is a fair average of the shipment, is tested, and the results published. Owing to the lateness in starting under the new Act it has not been possible to publish the results early this season. If the purchaser wishes to have samples of his own purchase analysed he must pay for same (*vide* regulations published in this issue). The action of the Inspector should be sufficient protection to the purchasers, as the fact that he can at any time enter any warehouse or store where fertilisers are kept, take samples for analysis, and publish the result, will in itself prevent any dishonest dealer from selling fertilisers under a false analysis. It rests with the purchaser to make this work more effective by refusing to accept unbranded bags of fertilisers, and insisting on the seller giving a proper invoice as required by the Act.

Owing to reports of the heavy milk yields of prize Holstein cattle, many inquiries are made by our dairymen from time to time as to the advisableness of introducing the breed more generally in this colony. The following remarks by Mr. M. A. O'Callaghan, Dairy Instructor to the New South Wales Department of Agriculture, are commended to the notice of our dairymen:—"They (the Holstein cattle) must, however, have deep rich pastures to graze on, and no greater folly could be committed than to adopt this breed in our inland country, where droughty conditions are frequent, or on light or even medium coast country. Anyone who has ever seen the rich flat fields of Holland, with grass and water in abundance, will at once recognise that a race of cattle generated for over 2,000 years on such a country would be suitable only for our richest coast country or for our deep river flats; and yet people in the interior grumble because the Department of Agriculture will not lend them a Holstein bull."

There are very many things existing which cannot be seen by the naked eye, and amongst them are the eggs of the wheat weevil. Because they cannot be seen by the ordinary eyesight, there are a number of people who insist that these beetles are produced spontaneously, that they "grow from nothing." Entomologists, and every other person possessing a powerful microscope can see the male and female beetles, can see the female depositing eggs, which eggs later on develop grubs, the grubs grow, change to chrysalides, and finally the perfect beetles are seen emerging from the chrysalis cases. In the face of such facts it is ridiculous to say that "weevils are produced spontaneously." Nothing that lives, or moves, or has being is produced except from a seed, or spore, or egg—"each producing seed after its own kind"—since the first creation.

Provident farmers will sow some white mustard, Essex Broadleaf rape, barley, and rye early in March, on land already well prepared, in order to secure a good early supply of succulent and nutritious food for their live stock during early winter, when it is more needed than at any other time of the year.

Professor W. Lowrie, M.A., B.Sc., Principal of the Roseworthy Agricultural College, South Australia, made sandwiches for his five stock by placing layers alternately of straw and kale, &c., in the silo. About a foot of kale and 13in. of straw was the proportion of each. The straw absorbed the surplus moisture of the kale, and the mixture was much appreciated by the stock, which thrived well whilst it lasted. Lucern and other succulent green herbage could be used in the same way, and good clean straw, cut early, would thus be converted into a highly nutritious fodder.

It is stated that some of the London salesmen find much difficulty in disposing of all the Australian mutton imported into England, owing to many of their customers taking frozen rabbits instead. The Australian rabbits are purchased by the poorest classes, who take the cheapest meat they can get, which, in the absence of rabbits, would be Australian frozen mutton. As the *Australasian Pastoralist's Review* remarks, it certainly seems very hard that the pastoralist should have to fight "bunny" on his pastures, and again in the London market.

In Cape Colony there is a plant known as resin pimple bush (*Euryops tenuissimus*) which has spread considerably in certain districts, to the exclusion of grass and other useful bushes. This pimple bush grows to a height of 8ft. to 10ft., and is of no particular value, hence its spread was a matter of serious importance to landowners. In some parts, however, the plants were being destroyed by certain scale insects, one of which was new to science, and, as far as known, does not attack other bushes. As a result of the work of the economic entomologists, efforts are now being made to exterminate the bushes by infecting them with this new enemy. So far its effects have been distinctly beneficial, but it yet remains to be proved whether the destruction of a greater portion of its natural food will not result in its attacking other useful plants.

Last season Mr. C. N. Grenfell, of the Mount Templeton public school, received seeds of several varieties of saltbushes and perennial grasses from the Agricultural Bureau. These saltbushes were sown at the end of April; some germinated early in August, and others not till October. The land on which they were grown was so impregnated with alkali or salt that cereal crops had failed on it. Mr. Grenfell states that *Atriplex angulata* has formed bushes 2ft. across, and seeds freely; *A. halimoides* grew but little, but are still healthy; *A. vesicarium* is over 2ft. high, spreading luxuriantly, and seeding freely; *A. nummularia* is growing slowly, but is very healthy. Seeds of various saltbushes will be forwarded by the Agricultural Bureau to anyone sending stamped envelope with application.

The curculio beetle (*Otiorhynchus sulcatus*) from Spain and Mediterranean coast has been long since introduced into the Australian colonies, and is very troublesome in many orchards and gardens. The beetles are $\frac{1}{2}$ in. long, dark-brown, cannot fly, hide in the soil at the bases of trees and plants during the daytime, come out at night, climb up to the leaves, and eat half circular scollops along the edges. If prevented, or if they have eaten all the leaves, they will attack the bark. They prefer olives to other plants, but will attack every plant almost that grows. Spraying with Paris green, 1oz. to 10galls. water, 1lb. fresh lime, 8lbs. sugar will sometimes stop their ravages; but a certain plan is

to enclose fowls around the trees, and scatter a little wheat on the soil around the trunks. A few thin light stakes, 7ft. long are required, and sufficient 6ft. wire netting. When the fruit has been gathered, enclose as many trees as the netting will surround, scatter a handful of grain around each stem on the soil, rake it over lightly, and let the fowls do the rest. They will find pretty nearly every beetle. A lively hen with a dozen chicks will clear a dozen trees each day. The wire-netting could be fixed at the ends to the stakes, and rolled around the stakes when about to be shifted to a new position. The intermediate stakes should be very light, as they are only required to support the net in an upright position. At Woodville these beetles are causing serious damage to the lucern crop.

Great quantities of "vinegars" are sold that have no title to the name, and which are unwholesome and injurious. "Vin aigre" is French for "sour wine," and sour wine or sour apple juice is quite different from the mixture of wood acids and mineral acids sold under the name of "vinegar." Vinegars made from wine, or honey, or apples, or malt, are wholesome; but there is not nearly so much profit in the manufacture of these as there is in the mixing of those caustic stomach-destroying compounds that are sold to innocent consumers under the name of "pure" vinegar.

The Orange Judd *Farmer* (U.S.A.) mentions that the apple crop this season is smaller than at any time since reliable statistics have been taken. In 1896, the record year for apples, the crop was 70,000,000 barrels; in 1897 it was over 40,000,000 barrels; and the present year's crop is only 27,200,000 barrels. The European crops are also below normal averages.

Grape juice or the juice of any fruit can be preserved with the natural flavor entirely unaltered by the following easy process:—Press out the juice and strain through filter bags (made of fine flannel); then heat the juice slowly to 170° F., and keep it at that point for ten minutes. Have clean bottles in water nearly boiling, take one out, empty water out, fill at once with the fruit juice, cork with corks that have also been just taken out of nearly boiling water. Proceed this way till all the juice is bottled and sealed.

Mr. J. A. Foulds, of Franklin Harbor, considers that, at best, only a small area can be planted with date palms at Hergott and in that part of Australia, but the valley of the Murray, wherever the roots could reach water, would suit the growth of the trees, though probably they would not bear fruit in latitudes south of Wilcannia. Above that point the date palm would simply luxuriate. But there is a variety of date palm cultivated at Cartageena, Spain, in latitude 37° N., which is cultivated with great profit, and this would bear fruit in the Murray Valley right down to the mouth. As the date palm requires much less care than apricots, and is very profitable, it might be worth while to establish a nursery for the Cartageena variety at some convenient place on the Murray for experimental purposes.

FERTILISERS REGULATIONS.

In the *Government Gazette* of February 16, the following regulations under the Fertilisers Act of 1894 were gazetted.

Regulations Under Fertilisers Act, 1894.

1. The fee to be paid to the Agricultural Analyst by the buyer of any article used for fertilising the soil for an analysis of such article shall be as follows:—

For determining the percentage of nitrogen in organic form—

As nitrates	3s.
As ammonia	3s.

For determining the percentage of phosphoric acid—

(a) Soluble in water	3s.
(b) Soluble in ammonium citrate	3s.
(c) Soluble in acids	3s.
(d) Insoluble	3s.

For determining the percentage of potash in readily soluble form 3s.

2. The buyer of any article used for fertilising the soil may, if he desires to have such article analysed by the Agricultural Analyst, give verbal notice to the seller, at or immediately after the sale, that he intends to have such article analysed; and he may thereupon take samples of such article for analysis in the presence of the seller or his assistant.

3. (i.) The buyer may, at any time after the purchase of any article used for fertilising the soil, post or deliver a notice in writing to the seller that he intends to take samples of the article for analysis, and such notice shall state the time and place fixed for the taking of such samples.

(ii.) Such notice shall be given at least three days before the time fixed for the taking of the samples. If the notice is sent by post it may be addressed to the seller at his place of business, and he shall be deemed to have received it at the time it would have reached him in the ordinary course of post.

(iii.) The samples may be taken by the buyer, or some person authorised by him, at the time and place mentioned in the notice in the presence of some credible person of full age and capacity, and in the presence of the buyer, or of some person on his behalf if such buyer or person be present.

4. Samples of any article used for fertilising the soil taken for analysis shall be three in number, and shall, immediately after being taken, be fastened up and sealed and a label shall be attached to each packet, on which shall be stated—

- (1) The date and place of sampling.
- (2) The names of the persons present.
- (3) The name of the fertiliser and the figures or trade mark on each package.
- (4) The total number of packages from which the sample was taken; also the total number of packages comprising the lot sampled.

5. The buyer shall deliver, or send by post, one of such samples, with the invoice received from the seller, or a copy thereof, and the prescribed fee to the Agricultural Analyst, with a request to analyse such sample and determine—

i. The percentage of nitrogen in organic form—

- (a) As nitrates:
- (b) As ammonia:

ii. The percentage of phosphoric acid—

- (a) Soluble in water:
- (b) Soluble in ammonium citrate:
- (c) Soluble in acids:
- (d) Insoluble:

iii. The percentage of potash in a readily soluble form:

or the percentage as aforesaid of any one of the aforesaid substances.

6. The buyer shall deliver or send one of the samples taken to the seller and shall retain the other sample.

7. The regulations under the said Act made by Order in Council published in the *Government Gazette* on the 18th day of July, 1895, are hereby repealed.

“KEEPING” EGGS.—Eggs from hens where no rooster is kept will last good much longer than fertilised eggs. Eggs from fowls fed upon corn will keep longer than from hens fed upon mixed food. Eggs must be kept clean—wash at once.

MEAT INSPECTION IN THE UNITED STATES.

The following information, taken from the 1897 annual report of the U.S.A. Bureau of Animal Industry will show to some extent the precautions taken by the United States Department of Agriculture to prevent the consumption of meat unfit for human use.

The meat inspection force consists largely of veterinarians, and the unprofessional members are men of long experience in the work they have to perform. It is still impossible to inspect all the animals slaughtered for food in the United States, but the area of inspection is rapidly being extended. All the beef, and the greater part of the pork and other meat products exported to Europe is inspected. The work of inspection is located at 128 abattoirs and packing-houses.

The total number of live animals inspected was 42,310,107, of which 92,204 were rejected and condemned. Of *post-mortem* inspections there were 26,580,689, and of these 70,121 were condemned. This includes 18,617 carcasses out of 47,417 head rejected at the stockyard inspections. Portions of 49,295 carcasses were also condemned as unfit for food. Nearly 2,000,000 specimens of pork were submitted to microscopic inspection, 13,325 being found infected with trichinæ. The total cost of the inspection work amounted to 77,160dols.

Sufficient tuberculin to test 57,000 cattle for tuberculosis, and sufficient mallein to test 1,400 horses for glanders, was manufactured and distributed to State authorities during the year.

Applications were received for over 30,000 doses of vaccine for blackleg, which disease appears to attack from 10 per cent. to 15 per cent. annually of the herds in considerable sections of the country.

POULTRY NOTES.

Written for the "Journal of Agriculture and Industry."

BY D. F. LAURIE.

Various circumstances have compelled me to refrain for the last few months from continuing giving a detailed description of those breeds which experience has shown to be the most profitable to keep. It is of the highest importance that those who contemplate keeping a certain breed should be conversant with its leading features, for when one reads that a certain breed of poultry is celebrated for certain qualities the breed in its purity is referred to, not some half-bred specimen such as may be palmed off on the unwary and inexperienced. The truth is steadily gaining ground that the higher the class of stock the better the result. As I have previously remarked, there is no reason why pure-bred poultry should be delicate; when they are it is clearly the fault of the breeder, who goes to work in a haphazard manner. Not only must we select the best specimens of any breed we wish to perpetuate, but we must also ascertain that they are not only in good health themselves, but also bred from sound healthy parents. Feeding, as regards the stock birds, as much as the progeny, is an important factor, but one which unfortunately has but little attention paid to it. I shall always maintain reference to the fact that improper food can have no other than a bad effect. It is perfectly useless to argue with some people on this important question. As a great writer recently wrote, "They know nothing, therefore their wants are easily satisfied."

On a future occasion I hope to treat the matter of food and feeding very fully; at present I will devote myself to a description of a breed which deserves

far more attention in this colony than has hitherto been paid to it. I refer to the Wyandotte, which is of American origin. The Wyandotte owes its origin chiefly to the Brahma and the Hamburg, and has been in existence since over thirty years, when the Brahma was a utility fowl, and was not bred solely for feather, and was possessed of many sterling virtues. The grand laying qualities of the Hamburgs are universally known. Several lots of Wyandottes have been imported or purchased from the other colonies, but it is only during the last few years that they have made any headway. As far as I know we have at present representatives of three varieties here—the Silver or Silver-laced, the Golds or Golden-laced, and the White. In the other colonies the Buff is very popular, and Blacks are fairly plentiful; in America they have various other colors; some are said to excel as layers, and all are very quick to mature. I know of authentic cases of pullets laying at three months and two weeks.

As layers of nice-sized tinted eggs the Wyandottes have a world-wide reputation, and during the cold weather, when other hens are not as a rule laying, the Wyandotte gives a good return. The Wyandotte cannot rival the Minorca or Leghorn, but as a general purpose fowl they stand well up. Their table qualities are excellent, but in their pure state the skin and flesh are tinged, and anything in the way of poultry that is not white or pale cream-colored does not please the eye of the English epicure, whom we hope soon to cater for extensively. Crossed with Old English or Indian Game, or Dorkings, we find the resulting chicks a very fine quick-growing table bird of excellent quality and pleasing appearance. I was informed by the Victorian authorities that some Indian Game-Wyandottes gave the greatest satisfaction, and realised good prices in the English market. Many correspondents have written to me that the Dorking is not suited to their country, and where we find it impracticable to breed the very highest quality of table bird, we must approach as near thereto as possible. Crossed with the Indian Game the progeny of the Wyandotte will be found as a rule only of a pale cream color as regards skin and flesh; the chicks are remarkably shapely, and as they mature very rapidly, they are fine large birds when quite young—a point of great value when it is considered that the sooner a bird is fit for disposal the greater the profit. The modern Wyandotte is more often white-skinned than the bird of ten years ago—at any rate this is the case with English-bred birds.

The General Characteristics of the Cock are:—Head: General appearance resembling that of the Brahma of the fine-headed type, short and broad. Comb: Rose, but narrow and long; surface even and uniformly studded with small points, spike behind much less than in Hamburgs, and rather curving down behind to match the curve of the head itself; wattles medium, ear lobes well developed. Neck: Rather short, with a good sweep, and full flow of hackle on to the shoulders. Body: General appearance short and broad, a plump shape, shoulder and saddle both broad, and short concave sweep to the tail. Breast: Full and round, more than most varieties, whole body deep through. Wing: Medium and deeply folded. Tail: Medium, well spread, and well carried up, but flowing, and in no degree squirrel-fashion. Legs and feet: Thighs short, fairly furnished with fluff. Shanks: Rather short, and pretty stout; toes well spread. Carriage: Very graceful, looking well balanced. Average weight: $8\frac{1}{2}$ lbs. adults, $7\frac{1}{2}$ lbs. young; these weights are as a rule considerably exceeded.

The General Characteristics of the Hen are in general the same as in the case of the cock, with usual sexual differences. Cushion generally rather more prominent in proportion; also fluffs. Carriage very neat and matronly.

Color of Silver-laced Wyandottes in both Sexes—Beak: Horn, tipped with yellow, or yellow streaked with horn. Comb, face, deaf ears, and wattles: Bright red. Eyes: Bright bay. Shanks: Bright yellow.

Color of Cock.—Head: White. Neck and saddle-hackle: White, with black stripes coming to a sharp point. Breast very heavily laced, or may be described as black, with a white centre to each feather, going off to a point or egg end tip at the outer end. Back: silver grey. Wings: Primaries, black on inner and laced on outer edge; secondaries, black on inner and a wide white lacing on outer web; coverts heavily laced, or so spangled as to produce two well-defined lace bars across the wing; wing bows and shoulder coverts laced with white. Tail

and tail coverts: Glossy black; lesser coverts laced with white. The thighs should be laced with black well over them, and fluff behind, dark slate, powdered with grey; white objectionable. Under fluff or under color: Slaty grey or slate.

Color of Hen.—Head: Grey. Hackle: White, with broad black stripe. Tail: Black; coverts with small white centres. Wings: Primaries, black, with lower edge laced with white; secondaries, black on inner web, outer web broadly laced with white on under edge. Body: White, laced all over with dense black as evenly as possible; but the back and cushion are more heavily laced than the breast, more resembling the marking described for the breast of the cock. Lacing to go well over the thighs; hinder fluff, dark slate, powdered with grey; light fluff objectionable, but not a disqualification.

Color of Golden Wyandottes.—Same as above, substituting a rich golden ground, as in the Golden-spangled Hamburg, for the silver.

Value of Defects in Judging.—Standard of perfection: A bird perfect in shape, style, color, etc., and in perfect condition, to count in points 100. Defects to be deducted:—Bad comb, 12; white or yellow in deaf ear, 6; faults in hackle, 8; bad marking, breast and body, 12; bad marking, back, 8; bad marking, fluff, 5; faults in tail (other than below), 4; pale or sooty shanks, 8; want of symmetry (especially of breast), 25; want of size, 15; want of condition, 15.

Disqualifications.—Comb otherwise than rose. Conspicuous spotting or peppering on ground of feather. Feather on shanks. Whole white or yellow earlobes. Wry tail or other bodily deformity. Any fraudulent dyeing, dressing, or trimming. Any tail feather missing.

The Wyandotte is very popular both in New South Wales and Victoria, and is described as a farmer's fowl, and no doubt this bird will do well here. It is very hardy, and matures quickly. For the fancier there is ample scope, for a crack is not bred every day. Different breeders have favorite colors—the golds seem by all accounts to be the best layers; for crossing for table any color will be found satisfactory.

DAIRYING.

By G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

Cheddar Cheese Experiments.

A series of experiments in Cheddar cheesemaking has been in progress at a dairy centre in the colony. The cheeses were manufactured during the recent hot weather, and therefore had a rather severe test. As would be expected, the milk was in a few cases tainted, but in order to reduce the difficulty a pure culture was prepared and added to the milk prior to renneting. The influence of the culture was most interesting during the cooking process. Shortly after the application of heat the taint became more pronounced on the surface of the milk, and the odor rising off the vat was decidedly strong, much resembling the smell of whey in the earlier stage of decomposition. Towards the close of cooking both taint and flavor were disappearing, and the curd evidenced a fair texture and aroma. After the removal of the curd to the cooler quick handling was entered into, giving the oxygen of the air every opportunity to execute its beneficial influences in improving flavor by bringing about a change in acid formation, and aiding in the escape of undesirable gases. When the period of salting arrived the curd was almost free from taint, which was only observed where a culture or starter was used; without the starter in one making the taint held sway throughout the entire process of manufacture. As will be seen from the accompanying record, the method of making was conducted upon the American or acid system. The name of "sweet" instead of "acid" would be more expressive and appropriate, as little acid is allowed to develop in the raw curd as compared with the Canadian and Cheddar systems. In one instance while working with the culture in very unfavorable milk the curd exhibited the presence of pinholes, no doubt due to the presence of a special bacterium which had overcome the culture after the operation of stirring, and in all probability this bacterium was the result of milk contaminated with whey.

If circumstances had been favorable a study of this bacterium would have been made.

The manufactured cheeses will be carefully watched for changes in ripening, influences of different rennets, coloring matter, and salt. A number of cheeses will shortly be made upon the Canadian system, aided by the application of the latest scientific tests; also experiments will be carried on with a combination of the two systems. Full particulars will be given upon conclusion of the tests, which will spread over several months.

Cheese Record.

Date of Manufacture.	Gallons of Milk.	Quantity of Coloring used.		Temperature of Milk at Renneting.		Quantity of Rennet.		Time of Coagulation.		Temperature Heated to.		Time of Heating.		Time Settled in Whey.		Temperature of Cheese at Pressing.		Temperature of Ripening-room.	
		Ozs.	Deg. F.	Ozs.	Min.	Deg. F.	Min.	Deg. F.	Min.	Dg. F.	Dg. F.	Dg. F.	Dg. F.	Dg. F.	Dg. F.	Dg. F.	Dg. F.	Dg. F.	Dg. F.
5/2/-	388	11	83	15½	45	100	60	80	78	64									
6/2/-	215	5½	84.5	8½	30	100	50	80	84	68									
7/2/-	360	11	84.5	14	30	100	60	80	86	70									
8/2/-	350	9½	84	14	30	100	50	80	88	75									

As will be seen from the above, no special tests were made, the process being carried on similarly to that performed in our local factories.

The Dairy, London, publishes particulars of how the successful competitor made his champion cheese at the London and Kilmarnock dairy shows. The following is an abstract:—Quantity of milk, 112galls.; starter (Drummond's), ½gall.; second test twenty-two; time of ripening, sixty-five minutes; temperature of renneting, 85° F.; quantity of rennet, 4½ozs. full; time when added, 7.45; time of coagulation, fifty minutes; temperature heated to 100°; time of heating, fifty minutes; time settled in whey, fifty minutes; quantity of curd, 115lbs.; time of milling, 1 o'clock; quantity of salt, 2lbs. 5ozs.; time when salted, 2.10 p.m. The companion cheese, which was first along with the champion cheese in class 6, was made substantially as above.

It is earnestly hoped that suppliers will thoroughly cleanse their milk cans from that abominable putrid whey, as good cheese will never be manufactured when such gross carelessness exists. One pint of such tainted milk will destroy the good quality of a making of 400lbs. of cheese, or, in other words, will mean a loss to the factory of at least £3 on 400galls. of milk. A taint of whey may be present in a can and yet cannot be discerned by the factory manager when receiving the milk; much greater, then, is the necessity of care on the part of suppliers.

Separator Slime.

All those working separators must be careful that the slime taken from the inside of the bowl is not, under any conditions, allowed to go into the skim milk, or be mixed with food for pigs. Many forms of bacteria are always to be found in separator slime, including, in a large number of cases, the germs of consumption. I have seen the tubercle bacilli cultivated from eight out of ten samples of slime and inoculated milk fed to guinea pigs. In no instance did the guinea pigs survive the disease. Microscopic examination has shown that when milk taken from a tuberculous udder is passed through a separator dense clumps of the bacilli are deposited amongst the slime, and single forms in both the skim milk and cream. In Northern Germany, some years past, tubercular disease was very common amongst pigs where separator slime from the large creameries was used in the feeding. Experiments will be carried on with the feeding of guinea pigs on a mixed food containing separator refuse, and study the results.

CONTAGIOUS STOCK DISEASES IN GREAT BRITAIN.

During the year 1898 there were 558 outbreaks of anthrax, and 856 animals destroyed; slightly less than in 1897. Of foot and mouth disease there were no reports. Glanders, including farcy, returns 751 outbreaks, with 1,380 animals attacked, being only 250 less than the previous year. Pleuro-pneumonia still claims 1 victim, and 220 were slaughtered as having been in contact. Only 17 dogs were reported as affected with rabies; a great decrease, said to be due to the muzzling orders, as the numbers in the three previous years were respectively 155, 438, and 672, beside which 93 other animals were attacked. Swine fever still claims a number of victims, but the number of outbreaks is reduced from 5,166 in 1896 to 2,514 in 1898, with 43,756 animals slaughtered as diseased or as having been in contact.

Scab in sheep continues prevalent, and in the month of December, 1898, 509 fresh outbreaks were reported, and scab existed in sixty-three counties in England, Wales, and Scotland. It is a pity that better use is not made of the numerous specifics for the cure of scab which are sent out to the colonies every year from Great Britain.

ORCHARD NOTES FOR MARCH.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

In the cooler districts the harvesting of apples and pears will be the chief work now in hand, and as storing and packing for export are necessary concomitants, these various operations may be treated together. The practice of gathering the whole of the crop from an apple tree at the one operation may be expeditious, but it is extremely doubtful, should no outside influence be threatening damage, whether it yields the best results.

In the large commercial orchards in Tasmania the complete operation of harvesting the crop from a tree is spread over several weekly pickings. It has been found that by thus lightening the burden of fruit and removing the specimens of foremost development from the trees, the cool weather of advancing autumn almost invariably enables the tree to develop up the backward specimens. This is only applying to the apple tree a rule which has long been recognised in general horticultural practice, viz., by lessening the numbers of developed seeds or fruits the vigor of the plant is conserved and spread over a longer period. An apple is ready to gather when it is found that by gently raising the pendulous fruit to a higher level than the point where its stalk joins the spur it will separate cleanly and without force, or when the pips are turning brown. These fruits should not be allowed to remain on the trees until a waxy exudation comes out upon their skins. This should develop in the storeroom. When the apples are gathered, baskets lined with thick bagging, fastened so that it does not rest upon the bottom of the basket, should be used. This will greatly obviate bruising. The careful handling of apples meant for export or storing should be more closely observed at this stage, while the skins are crisp with moisture, as the slightest contact with a sharp or hard surface will puncture them, and render long keeping impossible.

Apples intended for export or for storing have their chances of long keeping enhanced by being permitted to remain in the fairly dry atmosphere of an open shed or beneath the shade of a tree for a period extending from forty-eight hours to a week, according to the humidity of the atmospheric conditions then ruling. Where codlin moth is present in the orchard the packing or storing of

infested apples will be minimised if a longer period be allowed, as the detection of the injured fruits is then rendered easier and more certain. There is little new to report in packing apples for export, but there are details worthy of constant observance. I am confident before many seasons elapse our exporters will grade these fruits by mechanical appliances, as is now done with citrus fruits, and then the exact number of fruits of certain grades contained in any case will be known and stamped on each such case for the guidance of the buyer. Respecting the construction of the cases, the tendency to leave spaces of from $\frac{1}{2}$ in. to 1 in. in width between the battens is too prevalent, much to the detriment of the fruits through the cutting of the rounded surfaces of the fruits where they meet the edges of the battens, and much to the delight of wharf rats.

In packing cases of the present types I have always argued for the filling being done from the broad or flat side of the case, for the simple reasons that these cases are stowed in railway trucks, on trollies, and in cool chambers upon the flat side, thus any pressure from above—nearly the only possible pressure—meets the case at the point of least resistance, and the pressure is conducted upon the rounded sides of the fruits where they are least able to bear it. If the cases are packed on the flat a layer of wood wool or paper clippings may be placed upon the bottom, and the apples packed end on end until the case has received its complement; then another layer of this padding of a thickness defined by the fulness of each individual case could be placed on top so as to project, say, $\frac{1}{2}$ in. over the top. When the lids are nailed on the contents will be held firmly but gently, and the danger of bruising from the reasons advanced above quite obviated. The storing of apples deserves more careful attention than it has yet received in this colony. In most of our fruit districts the store-houses are as heterogeneous as the dwellings in a newly discovered mining centre. The main essential, viz., control of temperature, is practically unconsidered, and what is a very close second to this, viz., the control of diseases, both animal and vegetable, cries loudly for attention.

No doubt in many cases to the "eternal lack of pence" may be attributed many of the defects under review. Such are worthy of sympathy, but in many instances this cause does not apply.

In my observations in this and the adjoining colonies I have endeavored to note any small points in the storing of fruit with which I have come in contact, and from present evidence am of the opinion a storeroom of a semi-subterranean character, roofed with thatch and plastered over the top, or with an earthen layer over a wooden or iron roof, will assist in regulating the temperature. The interior should be fitted with shelves or benches sufficiently narrow to be reached across by a human arm of ordinary length. These should be a fair distance above each other, so that apples may be piled from 9 in. to 24 in. deep. Ventilation to be of real value should be arranged so that no direct draughts pass over the fruits, and the doorways should be arranged so that dry winds cannot rush through the house when a workman enters.

Pears will not stand much pressure owing to brittleness of skin; in fact, in the pear, as ripening proceeds, the skin appears to become disintegrated. Consequently, with the exception of a few of the tougher winter kitchen varieties, these fruits should not be piled upon each other if their long-keeping qualities are to be fully utilised. The house should be constructed so that it may be made almost absolutely airtight if required. The full value of fumigation when empty may then be realised for the destruction of insidious forms of insect or fungus pests, and, for the circumvention of codlin moth in particular, all of the internal shelving should be easily removable.

It sometimes happens in autumn, when the weather becomes cool before much rain has fallen, growers of citrus trees are inclined to lessen the applications

of water, if not discontinue them entirely. The trees suffer severely under such treatment, as the last days of autumn usually find the subsoil at its driest stage, and the enlarging fruits are an additional strain upon the trees. Loquat trees will be largely benefited by the application of a thorough soaking now, as an abundant supply of moisture gives additional strength to the shoots which will soon produce the blooms for next year's crop.

As the autumn growth on citrus trees improves, all dead wood should be removed down to a point from which young shoots are emerging, and even fairly large growing limbs may be removed successfully, and without much apparent shock to the trees.

Those who believe in the autumn planting of citrus trees should begin towards the end of the month. Personally I believe in the springtime as a more suitable season for transplanting these fruit trees.

In late localities budding will no doubt be possible early in March. These buds will remain dormant until next spring, consequently no shortening should be applied at present to the stocks.

Ties upon stocks formerly budded should be loosened from time to time, and as the union of bud and stock is completed should be removed entirely.

While any fruit remains upon the apple, pear, and quince trees (and for at least a fortnight longer) the bandages should be examined weekly for the purpose of destroying codlin moth caterpillars. All fallen fruits must be gathered frequently and treated, to destroy any larvæ concealed inside, and all props used to support heavily fruited limbs should be either scalded or burnt.

Where red scale is noticeable in the citrus plantations, sprayings with resin wash should be vigorously applied, always remembering to prevent damage to the trees, their roots should be well supplied with moisture prior to the spraying.

Outside irrigated areas cultural operations are practically at a standstill. The preparation of new land for tree planting could be undertaken now with advantage to the soil, but this work for want of time cannot be undertaken in many orchards in which the trees have reached a crop-bearing age.

NOTES ON VEGETABLE-GROWING FOR MARCH.

By GEORGE QUINN.

This month ushers in a season of activity in vegetable-growing over a large area of our colony. Where water for irrigation is available early plantings of cabbage, cauliflower, celery, kohlrabi, lettuce, onions, potatoes, and Brussels sprouts will be made, and cool changes—more especially if accompanied by showers—will be fully availed of for this work. If the soil is not soaked by rain a good moistening should be given prior to setting out the plants. These should be watered individually when planted, and if the area is small a mulch of stable manure spread around each plant is highly desirable.

To grow celery successfully it must be grown rapidly, and not lack nourishment at any time. It is grown here in trenches to enable the stems to be blanched by banking up from time to time. The trench is usually made about 18in. deep and from 18in. to 2ft. wide. The bottom is broken with a pick or fork, and a good layer of rich well-decomposed barnyard manure thrown in prior to the soil being replaced for a portion of the depth. A system now being used in America is to set the celery plants very closely on the surface of well prepared beds, and as they grow they come together and the leaves make a complete shade, thus blanching to a great extent the stems beneath. The idea is worthy of trial here, as it is much simpler and far less costly than our present practice.

Sowings should be made of peas, broad beans, radishes, cresses, carrots, parsnips, turnips, both Swede and garden varieties, spinach, parsley, and beets. As these will require much attention to repress weeds during their development, the sowings should be made in drills sufficiently wide apart to permit a free use of the hoe between the rows. As we may expect dry weather yet, it will be wise to cover all such sowings with a thin mulch of stable manure to prevent the surface of the soil caking before the weak growths emerge. Practice has shown that it is not advisable to apply fresh dressings of stable manure to the ground immediately before sowing deep-rooting crops such as carrots and parsnips, as the main roots have a tendency to branch and be reduced in value. In localities depending entirely upon rainfall, sowings in sheltered beds should be made of cabbage, cauliflower, onion, lettuce, kohrabi, &c., for future transplantings when the winter begins.

In many localities the sparrows show a decided liking for freshly sprouted peas and newly set cabbage plants. A simple remedy is to stretch black cotton threads along the rows just above the plants. Somehow the suspicious sparrow smells danger, and as a rule shuns the spot for a while, at any rate until the tender critical stage has passed. If dry weather continues, the lawn sprinkler is a most useful instrument in freshening up the young cabbage plants, a fact well demonstrated by many market gardeners.

It often happens that young plants of the cabbage family, when raised in seed beds in summer, become infested by the green larvæ of the cabbage moth, or are attacked by aphides. If these are present the young plants, prior to being set out, should be immersed for some minutes, roots and tops, in a strong solution of tobacco and soft soap. If plants already set out are attacked, they should, on the first sign, be sprayed with a similar solution, to which may be added a decoction of quassia chips. It should be borne in mind that only in the early stages of the plants' growth—prior to forming hearts—can these pests be successfully combated.

Summer crops will now be slackening off. Tomatoes should be raised slightly off the damp soil if the later formed fruits are expected to ripen. Trombones, pumpkins, marrows, and pie melons should be stored under shelter before the soil becomes wet and cold.

Cucumbers should be supplied with plenty of moisture if rain holds off, and the same applies to beans. Seeds of the latter should be saved if the sort has proved good, and the sample of high quality. Seeds should be collected from parsley, and supplies of herbs cut and dried for future use.

All beds not in use should be dug deeply and roughly, so that air and rain may penetrate freely to break down the plant food contained therein.

CODLIN MOTH.

In a recent issue of the *California Fruit Grower* the following reports of growers are given:—"In the season of 1896, just when the pear trees had dropped their bloom, I sprayed thoroughly with 1lb. of full-strength Paris green to 180galls. of water. Eighteen days later I sprayed again, and for the last time that year. My crop of pears was 88 tons, of which 9 tons were wormy. In 1897 the then prospective crop appeared to be so scattered that I thought it would not pay to spray, and I did not. The crop amounted to 32 tons, of which 11½ tons were wormy. In 1898 I sprayed four times—first, just when the bloom had fallen; the second and third times, at intervals of eighteen days; then jumping thirty days, I sprayed for the fourth and last time. The crop was 167 tons, of which less than 2 tons were wormy fruit. The cost of spraying is principally in the labor, but I found that by working things right

I was able to do the entire work of the four sprayings for 7c. (about 4d.) per tree." Another grower says that in 1897 he did not spray his apple orchard, and not more than 10 per cent. of his apples were free from worms. In 1898 he sprayed four times—twice in May, once in June, and once in July. He used Paris green according to the usual formula—1lb. to 200galls. of water. At the first spraying the Paris green was added to Bordeaux mixture. All the wormy apples were picked three times and immediately fed to hogs. As a result 80 per cent. of his apples were saleable as first quality.

CURL-LEAF.

Professor F. M. Webster, Entomologist at the Ohio Agricultural Experiment Station, writing on December 27, 1898, to the General Secretary of the Agricultural Bureau of South Australia, says:—"I notice in the *Journal of Agriculture* that you are having some trouble with the peach curl-leaf (*Exoascus deformans*). As this disease is quite prevalent here in Ohio, I thought you might be interested in some results we have secured by the use of strong whale-oil soapsuds, applied to the peach trees just as the buds were opening in the spring. In our work on San José scale we have had occasion to use a very strong solution of whale-oil soap, ordinarily of the strength of 2lbs. of soap dissolved in 1gall. of water; but in trying some experiments in large orchards we have been greatly surprised to find that a mixture of $\frac{1}{2}$ lb. of this whale-oil soap to 1gall. of water, applied to the trees at the time I mentioned, has resulted in almost a total preventive of this peach leaf-curl. This was tried last year with almost perfect success, but there was so little curl that I thought best not to say much about it until we could make a more thorough test. This year the disease has been extraordinarily severe, and our experiments of last spring have been proved to be all that we anticipated. Of course, you have a different climate, and possibly the foliage of the peach is somewhat differently constituted in South Australia than in Ohio, but I would suggest that your people undertake a series of experiments in a small way at first, and see if there is something in this that you can use to advantage in your country."

REMEDY FOR RED SPIDER.

Geo. P. Hall, of San Diego, California, writes to the *Pacific Rural Press* upon the subject of "mites" (known in Australia as "red spider"), saying that the following spray compound costs only two dollars for 1,600galls., and is absolutely effective in getting rid of red spider (a pest which is becoming only too prevalent in South Australian orchards and gardens):—Take 20lbs. sulphur, mix it to a paste (not sloppy) with cold water in a barrel; then add to this wet sulphur 10lbs. caustic soda 98 per cent., and it will boil the sulphur like lime slacking; have 20galls. water ready to add to it as it boils, to prevent its burning. This is your stock solution, and when you get ready to spray your mites or spider put 40galls. water in another barrel, and take half a gallon of the stock solution and add to the 40galls. of water, straining it to prevent any sediment getting into the spray; use this, and strain it to take out any sediment there may have been in the sulphur. Be sure to use sulphur, and not yellow ochre. Remember, this is for mites and red spider only. Where you want to kill young scale just hatched or born, as well as mites and red spider, use the following formula:—Concentrated lye or caustic soda, 1lb.; sulphur, 8ozs.; mix just as you did the above; add 15galls. water, and spray the trees at this strength. For scale, spray every thirty days for three months or more, and you will kill all you hit. Trees should be open so that you can spray them. Birds' nests and cobwebs are nice hiding-places.

COLD V. WARM WATER FOR PLANTS.

In the Fifteenth Annual Report of the Wisconsin Agricultural Experiment Station there is an interesting account of some very careful tests conducted to ascertain the relative effects of cold and warm water applied to plants. The plants which were used in the experiment were tomatoes, radishes, lettuces, and coleus, and the results are summed up as follows :—

From the results of these and numerous other trials not here noted the conclusion appears fully warrantable that the growth of ordinary field and garden crops is not affected by the temperature of any water ordinarily available for irrigation purposes. The temperature of the soil about the roots of the plants so quickly regains its original temperature that no check to growth is likely to result. It is concluded from the results of the outdoor work that no harm can result from using for irrigation purposes water from the coldest springs or wells, for in Wisconsin the temperature of the water from these sources will not be less than 40deg. in any case when taken from the well or spring, and by the means ordinarily employed in irrigation would be raised many degrees above this point before reaching the roots of the plants. It is concluded from the results of the greenhouse work that for vegetable and flowering plants commonly grown under glass, well or spring water may be freely used at any time of the year without warming. [Hothouse gardeners and Chinese vegetable gardeners always use warmed water for spraying or sprinkling on the foliage of their plants; indeed, if very cold water were used much injury would result.—ED. J. of Ag.]

BRINJALS, OR EGG-FRUIT.

Under the name of “Aubergines” the French people greatly appreciate the “brinjal” of India, or the “egg-fruit” of the Britisher, or the *Solanum melongena* of the botanist. In some parts of India this fruit or vegetable is considered to be one of the essentials to civilised life, and in Spain they are as commonly used as we use marrows and squashes. There are several varieties of brinjals—some white, and exactly like hens’ eggs, whilst others are purple, black, and other colors, and weigh up to 9lbs. each. They are used for flavoring soups, hashes, stews, curries, and made dishes generally, and are often cooked as a vegetable. The following are a few good methods of utilising brinjals :—

BRINJAL CUTLETS.—Boil whole till tender, cut in halves lengthwise, do not break the skins, remove the pulp and save it, and fill with a mincemeat made of cold cooked meat, onions, sweet herbs, pepper, salt, and herbs to taste, mixed with the original pulp; put in a frypan with nice butter or dripping, and cook with egg and bread crumbs until browned.

BRINJAL CURRY.—One pound raw beef cut small, four small brinjals peeled and sliced, two or three onions sliced, two tablespoonfuls curry, water to cover, simmer till cooked, then add the juice of one lemon. If the milk and juice of a cocoanut can be got in place of water the curry is still nicer.

FRIED BRINJAL.—Cut lengthwise into five or six pieces, scald in boiling water to whiten them, then fry in butter, and shred on parsley. Finely chopped garlic may be added if liked.

BRINJAL BATTER.—Make a batter by beating one egg till light, add half a pint of milk, half a teaspoonful of salt, sprinkle of pepper, one and a half cupfuls of sifted flour, and beat till smooth. Peel the brinjals, cut into slices lengthwise $\frac{1}{2}$ in. thick, sprinkle with salt and pepper, dip into the batter, fry in hot lard or nice dripping till brown on one side, turn and brown on the

other side. No more than will cover the bottom of the pan should be fried at one time, and the dripping or lard must be quite hot before putting in the slices. Drain off the grease on brown paper, and serve very hot with tomato catsup.

BAKED BRINJALS.—Wash the fruit, place in boiler, cover with boiling water, boil half hour or till tender. Take out, cut in halves, carefully scrape out the soft part, leaving the skin intact with enough wall to keep it in shape. Chop up the soft part removed, add half a cup of crumbs, a large tablespoonful butter, half teaspoonful salt, and a little pepper. Mix well, put back in the skins, sprinkle lightly with bread crumbs, and place in the oven for a few minutes to brown.

BOILED BRINJAL.—Peel a 2lb. brinjal, cut into slices, place in boiling water, with teaspoonful of salt, boil twenty minutes, then drain, chop fine, add a large tablespoonful butter, level tablespoonful salt, a little pepper, put in a saucepan, stir constantly till boiling hot. Serve in a heated dish.

UTILISATION OF TOMATOES.

The following are tested recipes for high-class quality products in which tomatoes form the base :—

GREEN TOMATO CHUTNEY.—Miss Grant's recipe: Slice 1gall. green tomatoes, put a handful of salt to each layer, let stand three hours; then strain off the liquor, add a little cayenne pepper (say $\frac{1}{2}$ oz.) and four onions thinly sliced. Take 2qts. good vinegar, $1\frac{1}{2}$ pts. treacle, two tablespoonfuls dry mustard, one of allspice, one of cloves, and heat in a preserving pan until the vinegar begins to boil; then put in the tomatoes, onions, &c., let boil half an hour, stir often; put in jars, close, and seal whilst quite hot.

BEST TOMATO SAUCE.—A. Molineux's recipe: Procure 15lbs. tomatoes (small varieties if possible), $1\frac{1}{2}$ lbs. onions, $1\frac{1}{2}$ lbs. apples, $1\frac{1}{2}$ lbs. sugar, 1lb. salt, $1\frac{1}{2}$ oz. garlic, 1oz. ground ginger, $\frac{1}{2}$ oz. cayenne pepper, 1oz. white pepper, $\frac{1}{2}$ oz. cloves, 1oz. ground allspice, $1\frac{1}{2}$ pts. vinegar. Break the tomatoes, peel and cut up the apples, onions, and garlic, and place with the cloves in an enamelled pan or copper and boil till soft enough to pass through a fine sieve or colander. Put back in the pan, add the other spices after mixing them well with the vinegar to prevent lumpiness. Boil until thick enough, stirring very often; bottle and cork whilst hot.

TOMATOES for cooking, for jams, or preserves, or canning, should always be scalded and skinned before anything else is done with them.

RIPE TOMATO CHUTNEY.—Six pounds tomatoes peeled, $1\frac{1}{2}$ lbs. acid apples peeled and cored, 9ozs. stoned raisins, 8ozs. currants, 2ozs. lemon peel, 6lbs. brown sugar, 3ozs. chillies, 3ozs. brused ginger, $1\frac{1}{2}$ ozs. garlic, $\frac{1}{2}$ lb. onions, 4ozs. grated horseradish, a small bunch mint. Chop all coarsely, mix with $1\frac{1}{2}$ pts. vinegar, add $\frac{1}{2}$ pt. limejuice. Simmer in a saucepan till the mixture is clear, of a syrupy consistence, but do not cook till too soft. Place in jars and close up whilst quite hot.

PICKLED TOMATOES.—Take small red or yellow tomatoes, prick them with a pin, place in moderate size glass or stone jars, add a dozen chillies for each 4lbs tomatoes, cover with cold strong vinegar, cover down closely. Ready for use in two weeks. but will keep six months.

CHOW-CHOW.—Half a bushel green tomatoes, one dozen onions, one dozen green pepper, chop all fine. Sprinkle well with 1pt. salt. Let stand over night, drain off the liquor, and cover instead with good vinegar. Cook slowly one hour, then place in jars. Take 2lbs. sugar, two tablespoonfuls each cinnamon and allspice, one tablespoonful each of cloves and pepper, half a cup of ground

mustard, 1pt. grated horseradish, and enough vinegar to mix them. Boil well, and mix with the ingredients in the jars. Ready for use in two days.

TOMATO CATSUP.—Scald and peel ripe tomatoes, sprinkle with salt, let stand for a night, strain through a sieve to take out the seeds. For each quart add 1oz. cloves, 1oz. black pepper, one grated nutmeg, a little cayenne pepper, and salt if needed. Boil for half an hour. Cool it, add 1pt. cider vinegar or other strong vinegar. Bottle whilst quite hot, cork closely, and keep in a cool place.

TOMATO SOUP.—In making any kind of soup, always use cold water; skim well, especially during the first hour. To assist the scum in rising, pour in a little cold water occasionally, and skim thoroughly just when the liquid begins to boil again. Use salt sparingly, and season lightly with pepper. Allow 1qt. soup to three or four persons. For tomato soup take 1gall. of stock, made from beef, to 3qts fresh tomatoes, scalded and peeled; reject the hard centre, force through a fine sieve, and add to the stock; make a paste of butter and flour, and when the stock begins to boil stir in half a cupful of the paste, taking care not to have it lumpy; boil twenty minutes, season with pepper as needed.

TOMATO CATSUP.—Stew ripe tomatoes, pass through fine sieve to remove skins and seeds. To each gallon of pulp add 1pt. good vinegar, two tablespoonfuls salt, one tablespoonful each of black pepper and cayenne (if wanted very hot); boil twelve minutes, then bottle and seal whilst nearly boiling.

THE VINEYARD.

SEASONABLE NOTES.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

The fig tree puts forth its leaves and we know it is spring, and one might add that the murmur of discontent that rises from our vineyards is an almost equally reliable herald of an approaching vintage. The present season is no exception to the general rule, and during the past month growers flocked to Tanunda to ventilate their grievances and discuss that ever-green topic, the market value of their grapes. I am fully aware that in referring to the matter I am treading on delicate ground. Discretion, sometimes the better part of valor, whispers that in family quarrels third parties are never welcome; that it were better for a servant of the public to steer clear of controversial matter that is not purely technical. So thoroughly convinced am I, however, of the great damage these perennial difficulties are doing to an industry on which much capital, both private and public, has been spent, that at no time have I hesitated to discuss the question openly and frankly, more particularly as they are brought about by circumstances involving in blame neither party. I make no apology, therefore, for referring to the matter at so seasonable a moment.

Looked at from an abstract point of view the question resumes itself as follows:—On the one hand, sellers considerably outnumber buyers; their goods are perishable, and must be disposed of within a very limited space of time. On the other hand, the buying and storing capacity of buyers is naturally limited. Both parties come face to face at the vintage time, and it would be the height of absurdity to expect either of them to infuse into their dealings a greater amount of philanthropy than obtains in other ordinary business transactions. That the buyers occupy the better position of the two is undeniable; but this can hardly be imputed to them as a crime. Theirs are the greater risks, and theirs the greater sinking of capital. That "market value" and "intrinsic value" are not necessarily synonymous, is not reserved as the peculiar knowledge of economists—the market value of grapes is regulated by the prices buyers are prepared to offer for them, independently of any action of

the growers; and so long as the numbers of the former are not unduly swelled—so long as competition does not come to mar the harmony of their purchases—it is contrary to all human experience to expect that, under the circumstances, this market value will ever rise above what need absolutely be given. At the same time, besides being unjust, it would be equally absurd to suppose that buyers, whose means of subsistence depend on the supplies of growers, would knowingly combine together with the object of crushing the latter out of existence by offering prices below cost of production. Whatever may be said against this division of labor, it would be unfair to overlook the fact that growers and makers are bound together by a bond of common interest. The grower has become necessary to the maker, and the latter cannot but wish to see the former satisfied with the fruit of his labors. Unfortunately this economic partnership is too one-sided, and, as might have been foreseen, has told against the weaker partner. For some years past the market value of grapes has been gradually receding, terminating at the official quotation of £1 10s. per ton for common varieties. If interest on the value of the land, on capital lying idle while the vines were coming into bearing, depreciation of stock and implements, gradual deterioration and ageing of the vineyard itself, etc., be taken into consideration, such a price, representing £2 5s. an acre for a 1½ ton crop, is certainly below the cost of production. True, that in recognition of the general shortage of the crop a rise of 10s. per ton has been conceded this season; but this rise, that would have been welcomed a year or two ago, nay, that would be welcomed to-day were it known to be permanent, has only given rise to still further discontent. Undoubtedly the average yield of 1½ tons might, by more judicious and thorough cultivation, be notably raised; but what man in his senses would undertake to spend more per acre than was absolutely necessary, with the prospect before him of a still further reduction in prices, and possibly the information that there was no room for his increased yield. That all further planting has been effectively checked for many years to come goes without saying; but, further, few will wonder that present growers are casting longing eyes at wheat growing, with its certain profits and quick returns, and that in some cases uprooting has become the order of the day.

Such is the present regrettable state of affairs, brought about, not by individual faults and shortcomings, but by a system built up on a faulty base. Grapes cannot be objects of barter between contending parties. To those who do not disdain to read the lessons of daily experience, it must be evident that it is impossible to separate the grower from the maker. If vine-growing is to progress in this country the grower must combine wine-making with his present avocations. It is a commonplace objection to such an arrangement that it would flood the country with worthless wines. There is little doubt, however, that the very reverse would be the case; it would at all events be conducive to greater uniformity in our wines. Under the present system, when every maker has to attend to both wholesale and retail trade, the number of brands that confuse the eye and palate of the consumer may be represented by a large multiple of the number of our cellars. In lieu of the present arrangement, create on the one hand a class of growers combining wine-making with grape-growing, and on the other merchants buying up the wines, blending them, and putting them before the public, and see whether the standard of excellence of our wines will not have been considerably raised.

I am well aware that these changes, of the necessity of which I am absolutely convinced, cannot be brought about in a day; that wine merchants are not to be called into existence by a wave of the hand; that were growers to start to-morrow to make wine they would at the outset be met by considerable difficulties in getting rid of their wares; and finally, that in most cases they have not at their command capital sufficient to start wine-making. All such

objections, however, may be overcome by the adoption of a plan that has found favor in Victoria, viz., by calling into existence central cellars that would fulfil the role of wine merchants, and buy up wines throughout the country. Such cellars might either be left to private enterprise, protected by a State guarantee of interest; or, failing this, they might be run on co-operative principles as a Government department. Sooner or later some such plan will have to be adopted, but not until then will the grumbling of discontent that at present heralds the maturity of the fruit be converted into general rejoicing.

At this same meeting of Tanunda growers some time appears to have been devoted to the Phylloxera Bill now before Parliament, and as far as may be gathered from the newspaper reports, those present did not seem unanimous in their approval of the principle involved. This is much to be regretted, as I cannot but feel that some such scheme might prove of inestimable benefit to those likely to be involved in the attacks of the terrible insect. As it was my suggestion, given in 1894, that is responsible for its initiation, I may be allowed to advance a few arguments in its favor. Personally, I cannot understand the position taken up by its opponents. What are their objections? What objections can be raised to the creation of an insurance fund for compensating possible losses of individuals incurred in the interests of the community? We insure our buildings, our crops, our lives, why not our vineyards? Should the phylloxera appear at any moment in a vineyard, in the present state of the law Government officers would immediately proceed to uproot every vine, and the owner would not be entitled to a farthing of compensation. Is this fair? These vines would have been uprooted in the interests of other growers; it appears to me only reasonable that they should contribute somewhat towards compensating the unfortunate owner. Such a scheme is certainly preferable to State compensation for the benefit of a limited section of the community. It is quite possible that in its minor details the Bill might be improved; it is earnestly to be hoped, however, that in its present or an amended form it will soon be law of the country.

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February opened up hot and finished up very wet. I am afraid that neither the heat nor the moisture were beneficial to the vintage. That one week's hot weather was sufficient to considerably reduce our yields, and the late rains will do considerable damage to the late crops unless they are rapidly harvested.

DISINFECTING FRUIT CASES WITH SULPHUR FUMES.

BY GEORGE QUINN.

At the Annual Congress of the Agricultural Bureau, held in Adelaide in September last, I drew the attention of fruitgrowers to the possibilities of using sulphur fumes as a ready means of destroying the larvæ and pupæ of codlin moth when secreted in cocoons in the joints of the fruit cases.

As the efficacy of the fumes for this purpose was at that time and since questioned, I resolved to give the fumes a fair test as the season came on.

On January 11 twenty full-grown larvæ, which I had collected from bandages in a Marden orchard on January 10, were placed into six ordinary wooden safety match boxes. These boxes were placed in a close tin box and allowed to remain until January 30. On opening the tin box I found three

moths had emerged, one caterpillar had died, and four others, after changing into pupæ, had perished. In well-woven cocoons five living pupæ were concealed, and in similar shelters seven active larvæ were remaining.

The corner of each cocoon was only slightly raised by means of a pin's point, to ascertain the condition of the occupant. When this was clearly gauged the lifted corners were stuck closely down against the sides of the boxes.

On the same day these boxes were placed in a large glass jar, into which the emerged moths were allowed to escape.

A small pinch of common sulphur was then placed on an improvised deflagrating spoon, and after being ignited was inserted into the jar. In less than three minutes the moths were killed.

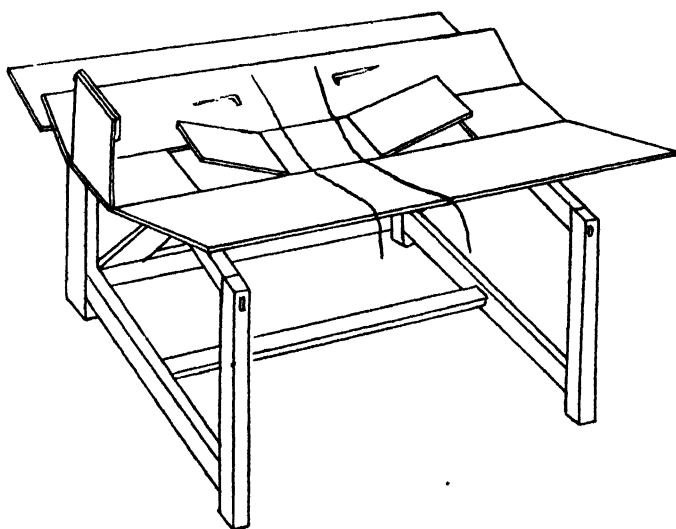
After two hours the lid was removed from the jar and the fumes allowed to escape quickly by tilting the jar. On January 31st a careful examination of the contents of the boxes was made, and all the pupæ and caterpillars were quite dead. They were kept for several days after to see if any revived, but none recovered.

These results certainly show the deadly effects of the sulphur fumes upon codlin caterpillars, and should encourage orchardists to try this method of disinfection, both for destroying insect and fungus diseases.

SOME HELPS FOR THE FARMER.

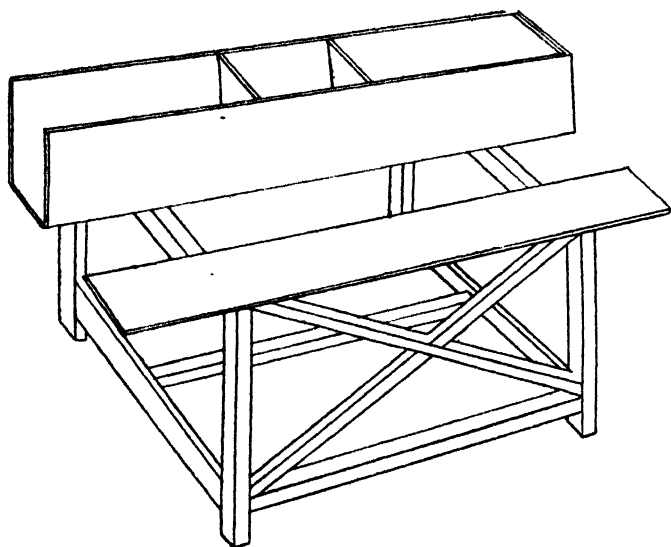
A Convenient Wool-box.

John Brumbach, in the *American Agriculturist*, 1893, said, "By using the wool-box shown in the illustrations, one man can tie the fleeces as rapidly as five men or six men can shear them. It is 5 ft. long by 1 ft. broad and deep. The bottom is divided into five pieces, each 1 ft. square. The centre and two end pieces are hinged to the two side pieces, as seen in the diagram, Fig. 1,



while the two squares, one each side of the centre piece, are hinged to the latter only, so that they may be raised towards each other, and at right angles

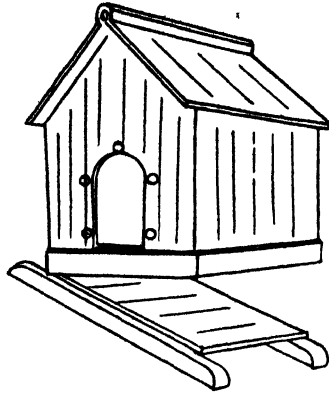
to the sides. At one end is an upright piece, 1ft. square, firmly fastened to the bottom. Upon the upper edge of this piece is a spring clasp which holds the sides in place when they are raised. The two erectable bottom pieces are held upright, when the box is closed, by springs in one of the side pieces. These springs are made of good strap-iron, and are fastened on with screws. There are holes in the side pieces through which the ends of the springs pass when the end pieces are being raised. The clasps on the stationary upright end piece are so constructed that when the knob is pressed down the clasps are raised off the sides, thus allowing them and the movable end pieces to fall back, when, after being threaded, they are ready for another fleece. The frame, or table, is separate from the wool-box. It is 4ft. wide, with a board 1ft. wide fastened on the top of the back edge of the frame, shown in Fig. 2.



This leaves 3ft. in front to lay the open box on. Eight pairs of hinges are used in putting the box together. The bottom pieces of the box are cut from one board 5ft. long. The movable end pieces should be sawn off diagonally, like a mitre joint, so as to let the edges rest on the edges of the stationary end pieces, and thereby avoid danger of sagging the hinges, and prevent the boards becoming uneven when the box is open. The twine is laid in grooves cut in the various pieces at proper distances, as shown in Fig. 1. Tying a fleece in this box is accomplished as follows:—The fleece is placed in the open box lengthwise, shorn side down. The wool is next pushed about as close together as it grew on the sheep, and the legs and belly-fleeces are lapped over. Now one side of the box is raised, thus folding one side of the fleece from one end to the other; the other side of the box is raised immediately after with a like result. The fleece at this stage is rolled up from one end to the centre, and the movable end-leaf is raised to keep it in place while the other end is being rolled and the last movable end-leaf raised, thus forming a square. After this the ends of the strings are drawn over the already compact fleece and tied. Finally the knob on the stationary end piece is pressed, releasing all the boards of the box, which fall open, leaving on the centre piece a beautifully packed square fleece."

An Easily Cleaned Dog-house.

The *Australasian* illustrates "Spratt's Patent, Limited," dog kennel, made to lift off the floor.



The advantages attached to this form of kennel are facility for cleaning, and ease with which it may be turned over, if necessary, to make a timid dog or a surly one vacate the premises for a time.

THIN SOWING OF WHEAT.

In a communication to the *Australasian*, Mr. J. Dreyer, of Northam, W.A., states that, on the advice of Mr. G. Valder, Principal of the Hawkesbury Agricultural College, he put in a small portion of his crop in 1897 with seed drills at rate of 20lbs. of seed per acre, the drills being 14in. apart. He had an excellent crop for the season, the two acres averaging about two tons per acre. This past season he drilled in 1,100 acres on the same principle, the drills being 14in. and 16in. apart. Owing to the season everything was dry-ploughed for the second year in succession, but the crop grew well, the plants stooling splendidly, the heads being well filled and long, and the straw coarse and heavy. The badly-ploughed land averaged 12bush., and on the better-worked soil the return was nearly 20bush. At Meckenig and Tammin, on soils resembling the mallee districts of Victoria, he followed the same practice, and in every case the results were excellent. Thomas phosphate was applied to all the crops at the rate of 1cwt. per acre. During the hot spell in September, some of the thinly-sown crops wilted somewhat, otherwise the returns would have been magnificent. He was quite satisfied from his experience and from conversations with others who had tried similar experiments that, given good cultivation and plump sound seed, 12lbs. to 15lbs. of wheat per acre put in with the drill with fertilisers was sufficient to produce a maximum crop. The crop will doubtless look thin, and the plants will not run together, but the fine head and the yield of grain will more than compensate for any failure in looks.

In experiments conducted by Professor Lowrie at Roseworthy Agricultural College last year, he got 2½bush. per acre more from land sown with 90lbs. per acre than from land sown with 45lbs. per acre. Many of our practical farmers contend that 30lbs. and under is quite sufficient to sow with the seed and fertiliser drills on well prepared land. A great deal will of course depend upon individual circumstances; but every farmer should conduct experiments in this direction for himself.

AGRICULTURAL CLASSES AT CLARE, JAMESTOWN, AND NARACOORTE.

When the public schools re-opened for this year agricultural classes were established at the above-named schools for teaching boys the theory and practice of agriculture. These classes are a part of the public schools to which they are attached, and a special teacher has in each case been provided to assist the head teacher in discharging his increased duties. The course of instruction followed is similar to that of the Agricultural School in Adelaide, which has now been in existence some eighteen months, and two of the three assistants employed, namely, those at Jamestown and Naracoorte, were specially trained for twelve months at the Adelaide school for this particular purpose. The assistant at Clare holds the diploma of the Agricultural College at Roseworthy. Pupils are already flocking in to join these classes, and the departure appears likely to prove successful. The fee charged is 1s. per week, and parents who think of sending their boys to the colleges in Adelaide for secondary education should look well at the curriculum of these agricultural classes before coming to a final decision in the matter. We understand that the Education Department is preparing prospectuses for issue in the country districts round the schools named.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

February 28, 1899.

Following January with a record for coolness, February early showed signs of a hot spell, which continued until after the middle of the month, giving a record high temperature against all previous Februaries. Sultry weather supervened, but during the last few days monsoonal depression has given our country districts a splendid rain (over 2in. in many places), the Northern Areas being most favored. If this is followed by cool weather a start of winter feed may be looked for, but it is yet early enough for it to be burnt up should March prove as hot as last year. The rainfall comes opportunely in many places to replenish the dams and tanks.

Business is fair, farmers generally finding their crops clean up heavier than expected, although murmurings about the low prices are still very rife.

In our last month's report we suggested that wheat shippers had been very freely making forward sales and fixing up charters, apparently in a strong belief of heavy future supplies. In Victoria and this colony, particularly the former, the past month has, however, given them a bad time; shippers, to avoid demurrage and other expenses, being compelled to pay in many instances relatively higher than European rates to fill their vessels. At our own ports prices in advance of quoted rates in some cases being also paid, and the local market at moment is strong, although London quotations for prompt shipment, 28s. per quarter, will hardly warrant any increase in price here, but the possibilities and dangers that surround the late winter and spring season in the northern hemisphere, many growers consider justify their holding, as it is argued that any turn at all in the world's price must be in an upward direction from the present low quotations. Sydney has taken a little S.A. flour during the month, and there are a couple of cargoes now being loaded for South Africa; with these exceptions, however, millers complain of dullness of trade, local bakers generally declining to stock. Bran and pollard steady. Feeding grains have hardly shown any alteration; hay and chaff firmed up a little, but the rains now will no doubt again check demand.

In potatoes, deliveries have hardly been equal to the demand, although both local and Mount Gambier samples have been coming on the market together. As locals are beginning to show signs of stocks becoming exhausted, values are likely to maintain. Some small parcels have been exported, but this outlet has at moment ceased and is not likely to be resumed this season. The rains that have fallen will cool down and improve the keeping properties of potatoes in the ground, so that digging will soon be in full swing. The onion crop in the Mount Gambier district has suffered considerably during the past month, and authorities now write down the estimate at 1,000 tons instead of nearly double that quantity expected at the beginning of the year. Locals have been plentiful.

Under the heading of dairy produce moderate business has been doing in butter. The hot spell whilst it lasted had the effect of lessening consumption, but as it also caused considerable shrinkage in supplies, values advanced, and at moment are firmer. European markets are strong. Owing to the shipping period for the season having expired, and a considerable surplus

in Victoria being still available, that market has eased, and prices during the next month or two, at least, are not likely to go much higher. Eggs, somewhat unexpectedly for the Lenten season, eased in value, but have recovered again and show firming tendency. The consumption of cheese has materially increased, as a result chiefly of the setting in of warmer weather, but also induced to some extent by the present cheapness. Demand for bacon has been brisk, but a marked easing in selling rates of the live material is making prices of the cured article a shade lower. Honey is plentiful, and even the ruling low quotation has not caused increased demand. Beeswax has brisk sale. Almonds somewhat scarce. Since the opening of the year poultry has been selling very fairly, but there is an absence of the long prices realised during the greater part of last year. Quantities coming forward show considerable increase; still good birds sell well, and prices all round are very fair for vendors.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, 2s. 7d.; outports, 2s. 5d. to 2s. 6d. per bushel of 60lbs.
 Flour.—City brands, to £6 10s.; country, £6 to £6 5s. per ton of 2,000lbs.
 Bran.—8d.; pollard, 8d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 4d. to 1s. 7d.; good stout white, to 2s. 6d. to 2s. 8d. per bushel of 40lbs.
 Barley.—Malting, 2s. 6d. to 3s. 4d.; Cape, 1s. 4d. to 1s. 6d. per bushel of 50lbs.
 Chaff.—£2 10s. to £2 15s. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—Local, £3 10s. to £3 15s.; Mount Gambiers, £3 12s. 6d. per 2,240lbs.
 Onions.—£3 5s. to £3 10s. per 2,240lbs.
 Butter.—Creamery and factory prints, 1s. 1d. to 1s. 3d.; dairy and collectors' lines, 7d. to 1s. per pound.
 Cheese.—S.A. Factory, large to loaf, 4½d. to 6½d. per pound.
 Bacon.—Factory-cured sides, 7d. to 7½d.; farm lots, 6d. to 6½d. per pound.
 Hams.—S.A. factory, scarce, 7d. to 8d. per pound.
 Eggs.—Loose, 9d.; in casks, f.o.b., 10½d. per dozen.
 Lard.—In bladders, 5½d.; tins, 4½d. per pound.
 Honey.—2d. for best extracted, in 60lb. tins; beeswax, 1s. per pound.
 Almonds.—Soft shells, 3½d.; kernels, 10d. per pound.
 Gum.—Best clear wattle, 2½d. per pound.
 Poultry.—Good young roosters, 1s. 4d. to 1s. 8d. each, hens and medium roosters, 11d. to 1s. 3d.; ducks, 1s. 8d. to 2s. 3d., pigeons, 5½d., geese, 2s. 3d. to 2s. 9d., turkeys, from 4½d. per pound live weight, for fattening sorts, to 7d. for good table birds.

WEATHER AND CROP REPORTS.

BALAKLAVA.—This month has been a contrast to last—hot enough to satisfy even a farmer having mullenising to burn. Burning scrub, bushes, &c., is the order of the day. There is practically no stubble burnt here now, the land being cropped about once in three years only. Some have commenced ploughing in the lighter scrub land. Fruit is just about over for the season, and crows, silver eyes, &c., will have to move to fresh feeding grounds.

BORDERTOWN. Our crops are all now about harvested, and there is more wheat being delivered at our railway station than has been carted before since the opening up of our lands here. More land has been opened up owing to the drills and fertilisers, and the average is not under 10bush. Farmers are receiving manures daily for the coming season, and more drills are ordered. We have had very hot weather during this month, but have a cool change at present, which we hope will continue, though we have an abundant supply of good water for stock and domestic purposes.

BOWHILL.—Farmers are now busy getting in straw and wheat chaff for use in the winter. The wheat yield has come to hand, and for this district the average is 3½bush. to the acre. The price, 2s. 1d., is very unsatisfactory, the sample being one of the best that we have had for several seasons. In some cases preparations for seeding are being made, the opinion that early crops give the best yields gaining favor.

CALCA.—The past year has been notable for heavy winds or boisterous gales. Harvesting is now completed, the average of the district being about 3bush. per acre. The sample appears very good, weighing about 64lbs average.

KAPUNDA.—Stock generally are in good condition. Many farmers are taking advantage of the slack season to repair old fences and put additional straw on machine and other sheds. Rainfall for January, 1.31in.

LUCINDALE.—Harvesting is now about completed, serious delay having occurred owing to much broken weather. Results generally are satisfactory. Stock generally is in splendid condition. A few cases of impaction of the omasum have, however, been reported among dairy cattle.

MILLCENT.—The weather for February has been dry, and at times excessively hot. The nice spring of young grass brought on by January rains has been quite shrivelled up again. Crops everywhere turning out well but thrashing still going on. Potatoes not up to expectation; frosts and grubs having played havoc with them in places. Fruit will not be as plentiful as could be desired.

MOUNT COMPASS.—Rainfall for January 1.77. Stock are looking well. Early potato crops have turned out well.

MOUNT REMARKABLE.—Rainfall for January 0.50 in. February dry and very hot. Harvest operation about completed; yield for this immediate district above the average.

PINE FOREST.—The weather for the last month has been very changeable. Stubble-burning is general. Stock in good condition. Fruit trees seem to be dying in large numbers. The water we are getting in this part from the Broughton river is so brackish that the stock will scarcely drink it.

SADDLEWORTH.—Weather warm. This has suited such sorghum crops as have made a stand at all, and some patches promise well. Much chaff and straw has been saved. Fallowing begun on black ground. Grape crop is a good one. Stock doing well.

CONFERENCE OF NORTHERN BRANCHES OF THE AGRICULTURAL BUREAU.

GLADSTONE, FEBRUARY 17TH.

Present—From Appila-Yarrowie: Messrs. Wilden, Bauer, Hirsch, Stacey, and Klemm. From Caltowie: Messrs. Petatz, Potter, and McDonald. From Narridy: Mr. Nicholls. Port Pirie: Mr. P. J. Spain. Crystal Brook: Messrs. Venning and Miell. Koolunga: Mr. J. Jones. Gladstone: Messrs. King, Griffiths, Wornum, Brayley, Matthiessen, Tonkin, Coe, C. Gallasch, J. Gallasch, Shephard, Sargeant, Rundle, and J. Milne. Central Bureau: A. Molineux (Gen. Sec.), Prof. W. Lowrie, M.A., B.Sc. (also Principal Agricultural College), also Hon. A. Catt, M.P., Mr. A. E. Roberts, M.P., Messrs. J. F. Martin, J. Fergusson, and a large number of visitors.

Mr. J. King, Chairman of Gladstone Branch, presided.

Exhibits.

The platform and some side tables were covered with magnificent samples of grapes, peaches, pears, quinces, apples, tomatoes, mangolds, fodder plants, wheats, &c., in straw and grain, grown by Messrs. Brayley, Gallasch, Wornum, and Griffiths. Mr. Brayley also showed some beautiful samples of wool, and various wheats grown with and without the aid of commercial fertilisers. The wheats grown with fertilisers gave a yield of 10 bush. per acre more than was obtained from grain sown without manures.

The Chairman and the Hon. A. Catt, M.P., each addressed the audience upon the work of the Agricultural Bureau and agriculture generally. The Hon. A. Catt suggested, amongst many other ideas, that, as there was not much profit in selling wheat at 2s. 6d. or less per bushel, it might pay better to feed it to fowls or pigs.

Co-operation.

Mr. C. G. F. Bauer, Appila-Yarrowie, read a paper upon this subject written by N. Hannagan of the same Branch. The following is a condensation:—

He was convinced that before long our dairy exports would become an important item; but it would be necessary to establish a co-operative central butter factory, with auxiliary creameries in all centres of population. Cream can be sent long distances by rail. With such a factory butter of uniform quality could be made, enabling us to compete in the markets of the world. Such a factory would be likely to be kept busy all the year round, because whilst the feed is dry in the North the South is in its prime, and *vice versa*. The south and south-eastern parts of the colony possess a more favorable climate than the North for butter

and cheese making, and greater facilities exist for the conservation of fodder and silage. Under present circumstances there is not much encouragement to grow summer fodder and to put forth full efforts to increase the output of the dairy. There is need that the producer and consumer should be brought closer together. When best butter is selling in Adelaide at 11d. to 1s. per pound the price in townships 150 to 200 miles distant is generally 7d. to 8d. This state of things can only be improved by co-operation amongst farmers all over the colony. The value of butter, &c., imported into Great Britain during last year was:—Butter, £11,965,286; cheese, £5,417,777; condensed milk, £930,228; margarine, £3,712,884; total, £22,026,175. Australasia ought to have a large share in those figures. In regard to storage of wheat, he was not aware of any similar system to that of South Australia being adopted elsewhere. When carted to the storage-place at the railway station the roads are hard and fairly good, and there is not much work on the farm to interfere with the cartage. If left till later the roads may be wet and heavy, and seeding, ploughing, and other work on the farm require all the strength of the teams and attention of the farmer. Here again is an opportunity for co-operation. A number of farmers could club together and build sufficient storage for their grain at the nearest railway station or port. The cost would be individually small, and the grain would be protected against all weathers, and be ready for sale at any moment. The present Farmers' Union is not supported as it ought to be, but it could be made very beneficial to all farmers, as such organisations are in America, where they build their own stores. He had been informed that in Germany twinebinders could be purchased for 500 to 600 marks (£25 to £30), but in this colony they cost £50 to £60. If half a dozen farmers combined they could order direct from the maker, and get them at first cost. Nearly every class has its union or combination; why should not farmers co-operate?

There was a lively discussion, in which most the speakers agreed with the writer of the paper with regard to the benefits that would accrue to farmers through co-operation, and stress was laid upon the necessity to support the existing Farmers' Co-operative Union. Reference was made to the Hon. A. Catt's suggestion that wheat at 2s. 6d. per bushel might profitably be fed to pigs or fowls, or even to cattle or other live stock. Mr. Sheppard said it pays better to use best wheat at 2s. 6d. per bushel for feeding fowls. Screenings were of much less value. From 2bush. of wheat at 2s. 6d. per bushel, fed to his fowls, he received £2 15s. for their eggs, not counting what were used in the house. During August and September he received £5 15s. for eggs (excluding eggs used in the house) for 20bush. clean wheat valued at 2s. 6d. per bushel. The price realised was from 7d. to 9d. per dozen. A member from Appilla-Yarrowie during February and March realised 17s. 9d. upon 4bush. good wheat fed to his fowls. Mr. Greig, Koolunga, said much depended upon the kind of fowls kept, and their age. Old hens, above three years, would not pay for their feed. Professor Lowrie raised the question, what would become of the local markets if every farmer commenced to raise poultry and breed pigs to eat his wheat when prices ruled at 2s. 6d. and under? Generally it was a safe rule to go in for such things when prices of produce were very low, because most people adopted the opposite course. When pork, eggs, and poultry are high in price, many people will begin to produce, and the prices quickly decline. The Gen. Secretary mentioned that the Manchester delegates, who recently visited Australia, strongly recommended us to send mild-cured bacon to Great Britain, as none other would be acceptable there, whilst the demand was unlimited for mild-cured bacon. The meat needs to be only very lightly salted, and is then placed in a cool chamber, maintained at an even temperature of about 30° F. for five or six weeks, by which time the salt has permeated the meat and cured it. After the preliminary salting and cooling, the bacon could be transferred to the cool chambers of the ocean steamers, and the process of curing would be completed on the voyage. The smoking is also conducted in an automatically-kept cold chamber, where the cold smoke is admitted by means of tunnels. The principal of the Inter-oceanic Supply Company visited Adelaide, and was prepared to start a curing-house and purchase 4,000 pigs or more each week, but could find no assurance of a supply, nor could he obtain promise of rebate of duty upon pigs introduced from over our borders when the bacon was exported to Europe. Some members doubted

statements made by various experimentalists, that profit could be made upon pork sold at 3½d. to 4d. per pound, after being fed on wheat at 2s 6d. per bushel, unless perhaps the manure could be taken into account.

Sheep Dying in Numbers.

Mr. Stacey, of Appila-Yarrowie, stated that quite 100 of his sheep had died recently under the following symptoms:—Apparent paralysis of the fore legs; animals bound forward a few steps by means of the hind legs, then drop, and do not live long. They are in good condition, and the appearance of the meat when dressed is that of perfectly sound mutton. Mr. Venning said there were many sheep near Redhill dying under the same conditions. Mr. J. Freeman, near Koolunga, was also losing many sheep from apparently the same cause, and from other places similar reports were coming in. Many people attributed this epidemic to heat apoplexy; some thought it was due to eating *Euphorbia Drummondii* [of which there is very little, and it has been proven to be non-poisonous.—GEN. SEC.]; others thought stinkwort (*Inula graveolens*) might be the cause, but in several of the paddocks where the sheep had died there was no stinkwort growing.

Adjourned for lunch.

AFTERNOON SESSION.

Judging Entires at Shows.

Mr. G. Miell, Crystal Brook Branch, initiated a discussion upon this subject, contending that judges at shows ought to disqualify any entire that was not fully developed in all his parts. He considered it wrong to keep an imperfect male animal of any kind for breeding purposes and for hire, and after detailing the many disadvantages and disabilities incurred through the existence of such animals in any district, he suggested that the regulations of every Agricultural Society should disqualify any male animal when not perfect in the particular direction indicated from competing for the prizes offered.

Mr. Coe, Gladstone, said there was a strong feeling in the district upon this matter, and there is a movement on foot to hold a stallion show, where substantial prizes will be competed for. Mr. Fisher, who confessed to owning a horse which did not exhibit the full perfection required by Mr. Miell, but claimed that his progeny were as perfect as those of any other horse; and stated that the exhibit of full development (although present) sometimes did not occur till the horse was six or seven years old.

After a good long discussion a motion was carried that it is desirable that judges at agricultural shows should have the power to disqualify any stallion which does not exhibit his most important points in perfection.

Residual Value of Manures.

Professor W. Lowrie, M.A., B.Sc., Principal of Roseworthy Agricultural College, addressed the audience upon this subject, and was glad to have the opportunity to do so because several persons had wrongly credited him with having expressed the opinion that the application of phosphatic fertilisers ultimately had the effect of impoverishing or exhausting the soil. The contrary was the effect of such applications, as the land would be enriched in regard to an important requisite for plant life. Three principal items were likely to become more or less deficient in a soil where crops were grown and removed from the field. These three substances were phosphoric acid, potash, and nitrogen. Other things were of less importance, and were usually plentifully existent

there, but might need to be supplied in some cases. Upon a sufficiency of all three of the before-mentioned substances the full development of plants depended, and if either one were deficient in quantity, or not sufficiently available, then a full and mature crop could not be expected. At present most of our wheat lands did not contain a sufficiency of phosphoric acid, but there was enough of potash and nitrogen, and consequently, by supplying a little phosphatic manure, the wheat plant under favorable circumstances could develop to its fullest capacity, thus producing a heavy crop of grain. Of course, along with this extra quantity of grain and straw removed from the field an equivalent proportion of potash and nitrogen was also taken out of the soil, and the supplies of those substances in the land would be diminished accordingly. In time it would be necessary to apply also nitrogenous and potassic fertilisers. The mischievous and erroneous idea that phosphatic or other single-constituent fertilisers would exhaust and ruin the land was fostered sometimes by "drummers," who were agents for "complete" fertilisers. If a little extra quantity of phosphoric acid were put upon the land it would not be lost, and when it was found that the fields did not respond to applications of this substance it would then be evident that either or both potash and nitrogen were wanted. As a proof that commercial fertilisers cannot render land sterile he instanced Rothhamstead, in England, where plots for fifty-five years had been continuously cultivated under these fertilisers, and have given crops recently of 40 bush. per acre and over. It was apparent that in South Australia the land was crying out for phosphoric acid, and the application of even such small quantities as 80 lbs. to 100 lbs. per acre had given marvellous results. By continuing to apply this substance the successive crops will decrease the quantities of potash and nitrogen stored at present in the soil, and then it may be necessary to restore those articles, and perhaps give less phosphatic manure. He advised farmers not to buy compound manures, but rather to try experiments, and find out by that means what is deficient or which ingredient or mixture gives the best result. Try one turn of the drill with potash manure, or nitrogenous manure, with both mixed, and also with phosphate mixed with either and both the others. The crop will tell at once whether wanted or not. As to what manure to use depends to some extent upon locality and conditions. In some districts, where there is enough moisture and organic matter in the soil, it may be more profitable to use bonedust or Thomas phosphate. In dry districts, where there is little organic matter in the soil, it may be better to use the more readily soluble phosphatic manures. It is strange that so many farmers neglect farmyard manure, whilst they freely purchase chemical fertilisers. Farmyard is the best of manures, but if applied just before seeding it may cause too strong a growth, which will wither off when hot dry weather sets in. Farmyard manure should be applied before fallowing, so that it may become well incorporated with the soil, when its effects will be most beneficial. Thomas phosphate or basic slag is lasting relatively, because it is more slower in action; but it varies in solubility. There are districts in South Australia where it will pay farmers to use the less immediately available manures, but not in the North. The northern farmers should use super. In order to get the best results they must apply more of any requisite than the crop can take out in one season, because it is not possible for the roots to abstract all the food supplied during the short period of growth. In answer to questions the Professor said it was not proper to mix Thomas phosphate with sulphate of ammonia. He had found that in some localities commercial fertilisers could be profitably used where there was a rainfall of only 12 in. to 13 in. At the Roseworthy College farm for two years following, on fallowed land, he had secured 17 bush. of wheat per acre on a 12 in. rainfall. On limestone land superphosphate was undoubtedly best to use.

A special vote of thanks was unanimously accorded to the Professor.

Ploughing.

Mr. A. McDonald, Caltowie, read a paper, of which the following is a condensation:—

Since the time of the Pharaohs, and probably long before, some form of plough has been used, and during that time has been slowly and constantly improved till the present scientific and almost perfect condition has been reached in Australia—perfection due to the untiring zeal and persevering efforts of many skilful and able mechanics of South Australia. For opening up and turning over the soil, the parts of our most modern plough are so simple that the merest tyro can in a comparatively short time become familiar with their agency. The principal and most active parts are the wheels and the mouldboard. The wheels regulate the depth and width of the furrow-slices, and in a measure regulate the angles at which the furrows may be set up or turned over. Axles and wheels require frequent looking to, else they become dry, worn with sand and grit, and work loose, so as to prevent easy and proper performance of their functions. The mouldboard of iron should be so set as to throw the furrow-slice over at an angle of 45 deg. even and unbroken, so that the original surface shall be buried, and the under soil exposed to the light and air. The construction of the mouldboard must be adapted to the nature of the soil where it is to be used. In sticky tenacious soils it is necessary to use short breasts, or mouldboards, in order to save frequent cleaning, and to reduce the draught. In free sandy soils a longer board performs a much better class of work. No more agreeable and healthful occupation can be conceived than that of turning over a good, free, loamy soil with a suitably-constructed plough, drawn by a well-trained tractable team of horses. But conditions are not so pleasant when the soil is baked and dry, and the ploughman cannot make his implement enter or stay in the ground; or when the land is sticky and adheres to the mouldboard, necessitating frequent scraping. In order to become a good ploughman one must possess some inclination for the work. Unfortunately, nowadays, there are too many examples amongst our young men of a want of interest and pride in this work, although there are many creditable exceptions. In travelling about, one cannot help noticing the great number of fields that bear evidence of indifferent and careless cultivation, so much so that from a railway train in motion one can easily read accurately the number of furrowed implement that has been used by the consistent regularity with which every second, third, or fourth furrow (as the case may be) has been heaped upon its immediate predecessor. This defect could have been easily remedied by a simple adjustment of the wheels of the implement. Again, even when the lands have been laid out straight at starting, how often at the finish a number of short turns are necessitated, entailing a loss of time and energy trying to the temper of man and beast, besides leaving the work with a slovenly and incomplete appearance. Frequent patches or "pig troughs" are also visible in many fields, and are attributable to ill-setting of the plough, the carelessness of the driver, or the firmness of the land. If the latter, then the work had been better left until more favorable conditions prevailed. The difference between working a single and a multiple plough is only a question of degree. A hint as to how to successfully handle a plough may be briefly described. Wherever practicable, teams should be selected with a view to pace—fast and slow horses should not be harnessed together, but should be classed and coupled respectively. The fast horse, when coupled with a slow companion, tends to throw the draught of the plough in the direction of the side upon which he works instead of in a line with the beam. We will assume that the poles are set in line and a single plough to be used in marking out. The reins, which should be just to the length of the handles, should be gathered tightly, the ploughman should stand well between the handles, which should be firmly grasped well forward and not released until the motion of the implement ceases. The direction of the horses should be guided by a movement of the hands to and fro along the handles of the plough, at the same time using side pressure to lever the head of the implement in the direction desired. In this manner the horses can be driven, the plough guided, and a furrow taken throughout the length of the field in a perfectly straight line, and after this no difficulty should prevail in keeping the furrows straight. The first furrow should be about 3 in. deep, and upon the return journey one horse should be driven upon either side of the mark and the next furrow spread out in the opposite direction. These furrows are then turned back and the crown formed; but regard must be had when putting up the crown that too much depth is not taken, or an unsightly ridge will be formed, which will be difficult to depose in after years. The crown furrow should be about 4 in. deep, arriving at 5 in. about the fourth furrow. In using multiple ploughs the same exactness and regularity as to depth and width cannot be observed until the proper depth has been attained, and this varies according to soil, but a fair average is 5 in. by 10 in. The share should be closely watched, and when worn should be chipped—a process requiring experience. Care should be taken to set out all lands at right angles. Never pull about, ill-use, or thrash your horses. Do not take more land than the implement will properly turn over or the horses comfortably haul. If these principles are followed a better class of cultivation may be safely expected, and it is essential that equal attention be given to this branch of farm service that is devoted to other more discussed and perhaps more popular branches of the industry.

There was a good deal of discussion upon this paper, most of the speakers agreeing with Mr. McDonald. Mr. W. J. Venning, however, considered a 10in. furrow too wide, and thought 8in. quite enough.

Noxious Weeds.

Mr. J. Jones, Koolunga Branch, invited discussion upon the subject of "Noxious Weeds." In Koolunga and adjacent districts farmers were suffering very great losses through prevalence of star thistles, the seeds of which were brought down by the River Broughton when in flood, and spread over immense areas. These weeds covered the land to the almost total exclusion of other herbage, and the spines of the thistles made the legs of horses and cattle quite sore. He would be glad if the various Branches would consider what could be done to remedy this state of things. The Hon. A. Catt, M.P., bore testimony to the serious state of affairs in the localities affected by the flood waters of the Broughton, and did not think the cost of eradicating the weed over very large areas would be covered by the value of the land. A member directed attention to a paragraph in the *Journal of Agriculture*, which he presumed was written by the General Secretary, referring to the practice of leaving star thistles until the plants were in flower, when the seeds will mature, and on a windy day may be seen blowing across the adjoining paddocks, scattering their seed broadcast. He stated that the seeds were not winged, and were of considerable size and weight, so that they could not blow through the air. [The seeds of the true star thistle (*Centaurea calcitrapa*) are quite small, and are winged, or provided with an umbrella-like attachment which enables the wind to carry them about. In addition to this, the cut-up plants blow over the fields, and scatter the seeds as they go. The large, heavy, dark-brown angular seeds, about the size of a small grain of wheat, found amongst the grain, are those of the Barnaby thistle (*Kentrophyllum lanatum*), which is very often miscalled star thistle, and the seeds of this would also be shaken out when the cut-up plants are blown across the country.—GEN. SEC.]

At the opening of the evening session Mr. A. E. Roberts, M.P., addressed the meeting at some length.

How to Live on the Land.

Mr. J. O'Connell, Appila-Yarrowie, sent a good paper upon this subject. The following is the substance :—

Bad seasons and low prices make it important that close attention should be given to the minor as well as the major products of the farm. In former days this was not generally the practice, because wheat was easy to grow, good crops were secured, and fairly high prices realised. During the past five years wheat-growing has been a comparative failure, many producers have gone to the wall, and the question now is, "What are we to do?" In the first place expenses must be reduced by the practice of the strictest economy in every direction. This can be done by putting less land under wheat and entering upon other branches of farm industry instead. Do with fewer working horses, and employ less labor. Keep a few sheep, if only enough to save the butcher's bill. Every farmer should keep as many sheep as he has room for, but it is sheer folly to keep too many. A few good fat lambs every year would bring in a nice little cheque, and a bale or two of wool each season would add to the income. When farmers buy their butter, as is often the case, it is no wonder they do not prosper. Some farmers' wives pay off a good part of the store bill with the butter; why should others have to buy? The feed that useless, nondescript horses consume on many farms should be kept for the cows, and thus secure a return which those horses do not yield. Then comes the pig. Bacon has been a scarce and dear article for some time past, especially in this district, and storekeepers have to get their supplies from Adelaide. Fowls, though greatly despised by some farmers, are the most useful and the best paying animals on the farm. Last year South Australia exported eggs to the value of £50,000, and when we consider the rule-of-thumb, slipshod style of poultry farming carried on, it must be admitted that that amount could easily be raised to £500,000. A good sort of hen will lay twenty dozen of eggs during a year, which at 6d. per dozen, would equal 10s. A bushel of wheat, costing 2s. 6d., is sufficient to feed that hen for a year, so that she yields a profit of 7s. 6d. from eggs alone. From the young fowls—surplus

cockerels, &c.—if well looked after, there would also be a good lot of money. Farmers generally keep a most nondescript, miserable, weedy lot of fowls, and fancy that “nothing beats the good old mongrel barndoor fowl,” and then quietly tell you that “fowls do not pay.” Eggs from various kinds of pure-bred stock can now be purchased very cheaply, and by this plan it is easy to avoid bringing disease and vermin into the place. Mate the best of the young cockerels obtained from such eggs with the best of the common hens on the farm, and in two or three years a strain of fowls will be developed that will pay to keep, and of which the owner may be proud. South Australia is the finest country in the world for rearing all kinds of poultry. The winters are mild, and insects, grubs, &c., abundant, so that the birds will thrive immensely. There is an excellent market in Great Britain for all the eggs (and poultry of a suitable kind) that we can produce, and there is the Export Produce Department to ship through. Let us take advantage of them. We are a community of producers; let us extend our business and send many other kinds of produce. France exports annually over one and a half millions of pounds worth of eggs and poultry to Great Britain; is there not room for South Australia in this direction? We possess undoubted advantages, but our people want education and experience in exploiting the minor rural industries. Whilst wheat will always be the main product of our farming industry, the experience of late has proved that a system of mixed farming must be adopted in order to make a living from the land. “Many a mickle maks a muckle.” A little from this and a little from that will amount to a good round sum in the end.

There was not much discussion upon this paper, the propositions therein being so generally accepted and agreed to by most of the audience that there could be no controversy.

A comprehensive vote of thanks was accorded by acclamation to those who had taken such pains to organise the Conference, to those who had written papers, to visiting members, to the Chairman, and to those who had brought in the splendid exhibits of fruits, vegetables, fodders, cereals, &c.

It was resolved unanimously that the next Conference shall be held at Gladstone, on account of its central position, and the Conference then broke up.

FARM NOTES FOR MARCH.

BY THE EDITOR.

Haystacks that are not already thatched are in constant danger of being spoiled by wet. If time will not allow of thatching, they might be covered with roburite or willesden or similar roofing material.

Prepare land for sowing with peas, tares, rape, mustard, rye, barley, &c., for early feed.

Pigs to be fattened should be put up soon, so as to be ready by the time cold weather sets in. It is not advisable to have sows farrow during cold weather; therefore separate the boars from the sows.

Tools, implements, machinery, &c., not in use should be put under shelter after thoroughly cleaning, oiling, painting (when necessary).

Sheep should be kept upon every farm according to its capacity. They clean the fallows, eat up many weeds, provide fresh meat for the house, produce a few lambs for early market, yield a few bales of wool, and help the banking account.

Bare fallows should be scarified, and weeds destroyed thereby. Every weed that is allowed to escape is liable to produce a great many others by means of its seeds, and each weed impoverishes the ground in respect to at least four wheat plants or other cereals that may occupy the immediate vicinity.

In many parts of the colony next month is the best for sowing various grasses, clovers, trefoils, medics, &c. The land should be well prepared now, rolled, harrowed down fine and level, so that the seeds can be covered evenly at a depth of about an inch or less.

Where circumstances will allow, it is desirable to follow a cereal crop with some legume, such as peas, beans, vetches, &c.

Make a nursery bed with sandy loam, and sow seeds of cow cabbage, Jersey kale, and Drumhead cabbage for planting out when the rainy season sets in. These will be very useful for stock when feed begins to get dry. Prepare a field for the plants by deep ploughing and heavy manuring.

Field turnips and swedes may be sown on suitable land about the middle of the month. Parsnips and carrots may also be sown in drills on well-prepared land.

Fertilisers are in great demand, and it will be wise to give orders for phosphatic manures at the earliest date.

Potatoes should be planted only where early night frosts are not likely to occur. In rich loamy deep soils they may be planted, by aid of the plough, in furrows 4in. deep every third furrow, placing the sets at 1ft. apart.

A small lot of mangolds might now be sown, to give an early crop. For the main crop it is usual to sow in June till September. Lucern may be sown during this and next month in localities where the frosts are not early and severe. The land must be worked down very fine and level, and seed had better be drilled in $\frac{3}{4}$ in. deep, then roll.

Change of seed wheat is generally considered to be desirable. Care should be taken to secure rust-resistant varieties, some at least of early-ripening character. Yielding quality would of course be a consideration with every farmer.

FARMYARD MANURE.—Average analyses of various farmyard manures in a dry state show they contain the following fertilising constituents:—

Horse manure	2.08 per cent.	nitrogen,	1.45 per cent.	phosphoric acid.
Cow	1.87 per cent.	"	1.56 per cent.	"
Pig	3.00 per cent.	"	2.25 per cent.	"
Sheep	1.78 per cent.	"	1.42 per cent.	"

These figures can only be taken as showing approximately how the manures from the different animals compare with each other. The feeding, age, and condition of the animals will always influence the quality of the manure. The liquid excreta averages as follows:—

Pig	12.0 per cent.	nitrogen,	5 per cent.	phosphoric acid
Horse	10.9 per cent.	"	trace only	"
Sheep	10.4 per cent.	"	3 per cent.	"
Cow	10.0 per cent.	"	trace only	"

In the passage of food through the system of the common farm animals only a very small percentage of the fertilising substances is retained in the body, and even with fattening animals the loss is not great. The urine, as will be seen, contains more nitrogen than the solid excreta, and it is besides more valuable, being in a soluble form. The urine also contains nearly all the potash, but is lacking in phosphoric acid, hence the best results can only be expected when the liquid and solid excreta are used together. The influence exerted by farmyard manure on the texture of the soil in the process of fermentation is very great. This is specially so with close soils. It opens them to the action of the air, and renders them more friable. With clay and heavy soils it should therefore be applied fresh; on light soils, already sufficiently open and friable, the manure should only be applied in a rotten condition. On cold damp soils farmyard manure has a very beneficial effect, adding to the warmth as well as to the plant food.

PIG PRODUCTS OF THE UNITED STATES.—It is estimated that the number of pigs in the United States amounts to forty-one millions. The annual value of pig products exported is about £16,000,000, of which the United Kingdom takes nearly £10,000,000. The price obtained for American bacon in England averages under £2 per hundredweight, and for hams about £2 5s.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, FEBRUARY 1, 1899.

Present—Messrs. F. E. H. W. Krichauff (Chairman), Samuel Goode, W. C. Grasby, J. Miller, M.P., T. Price, M.P., A. J. Perkins, T. B. Robson, and A. Molineux (Secretary).

Farmers' Relief Fund.

The CHAIRMAN reported having gone into the scheme for a permanent relief fund for distressed farmers, as submitted by Mr. J. von Bertouch, of Eudunda Branch, and had made the following digest of it, with the exception, however, that he had altered Mr. von Bertouch's clause providing that only subscribers to the fund should receive relief from it in time of necessity.

A Central Trust Committee shall be selected, consisting of persons to be members of the Central Agricultural Bureau, and to be members of the present Central Drought-Distressed Farmers' Fund Committee.

The Central Trust shall appoint a secretary at such remuneration as may be found necessary. Districts may raise funds from subscribers paying either in cash or in kind. A bag of wheat or not less than 10s. for every 100 bags reaped per annum is suggested.

The subscribers in each district shall elect a District Committee, which shall forward the funds collected to the Central Trust in trust for such district on a separate account.

Subscribers shall have a preferential but no absolute claim for relief from a District Fund. If the District Committee recommends a subscriber as being in distress to the Central Trust, relief may be granted after due consideration of all circumstances, or declined, or partially granted.

Necessaries of life so granted shall not be returnable, but for any supplies of horse feed or seed wheat bills of sale over crops shall be taken, or else a bill of exchange.

A General Fund shall also be formed by the Central Trust from which relief can be granted to non-subscribers all over the colony, independent of any District, but District Committees shall be asked to recommend the persons requiring relief in the manner now adopted by the Drought-Distressed Farmers' Fund. To this Fund it is desirable to transfer the funds which may be in the hands of the Committee of the Drought-Distressed Farmers' Fund, after a general meeting of subscribers thereto has sanctioned such transfer.

All funds shall be invested by being lodged in the Savings Bank, or any other well-established bank, with liberty to draw as may be required, and annual balance-sheets shall be furnished to all District Committees and the general Central Trust.

He thought the Bureau might adopt this as an outline of the scheme, and appoint a committee to meet the committee of the present Relief Fund to discuss matters and ask the Branches in the meantime to discuss it, and to take steps to collect contributions.

Considerable discussion ensued, and a resolution was carried approving of the scheme as outlined, and a committee, consisting of Messrs. Goode, Miller, and the Chairman, was appointed to confer with the committee of the Distressed Farmers' Fund.

Conference and Shows.

The SECRETARY reported that the proposed Conference of Branches at Bute had been abandoned owing to lack of support by the Branches concerned. The Southern Conference was to be held at Strathalbyn and the South-Eastern at Naracoorte on March 24 and 29 respectively.

Shows of produce in connection with the Branches were to be held during March at Meadows, Cherry Gardens, Watervale, and Port Lincoln.

Takeall.

The CHAIRMAN read letter from Professor McAlpine, of Melbourne, *re* takeall. He was not aware that the fungus causing the disease had been determined, although he had found on specimens sent to him both *Cladosporium herbarum* and *Septoria tritici*, but was not prepared to say they were the cause of the disease. If specimens of plants undoubtedly affected by takeall were sent to him at any time he would endeavor to determine the cause of the disease. He stated that, as far as he could ascertain, takeall was unknown in other countries.

Professor PERKINS said some time ago Dr. Cobb worked out the cause of takeall, and determined it to be the fungi mentioned by Professor McAlpine. There was no doubt on this point. In regard to the question of takeall generally, the question was "What is takeall?" Wheat killed off by weeds, by bad drainage, &c., was said by many to be affected by takeall. Other members agreed that many cases of so-called takeall were caused by the mechanical condition of the soil and by special local conditions.

Extracts and Translations.

The CHAIRMAN tabled the following extracts and translations from Foreign Agronomical Papers:—

278. *How Deep to Plant Potatoes.*—At the Experimental Station, University of Wisconsin, U.S., in 1897, potatoes were planted on the 22nd May 2in., 4in., and 6in. deep, in rows 3ft. 6in. apart, and 2ft. 4in. in the rows. The soil was a rich, well-cultivated, light clay loam. The season was dry, and no irrigation was used. The crop was dug on the 13th and 14th October, and the result was—

From the 2in. deep	660 tubers ; weight, 191·40lbs.
“ 4in. “	518 “ “ 160·50lbs.
“ 6in. “	281 “ “ 47·80lbs.

The tubers were somewhat heavier from those planted 4in. deep, but the number was smaller, and much more so where they were planted 6in. deep.

279. *Quantity of Manure to be Applied to a Crop.*—Professor Maercker says this should be in accordance with the stored up plant food in the soil, and depending to a great extent on the removal of plant food by the previous crop. After a full crop more manure will be required than after a medium or poor crop; 240cwts. of potatoes per acre take 156lbs. of potash, which can be replaced by 12cwts. of kainit, while 80cwts. of potatoes would require only 4cwts. of kainit. The same crops would require, respectively, nearly 45lbs. and only 15lbs. of phosphoric acid, and this can be supplied in the first case by about 24cwts. of superphosphate of 18 per cent., or 3cwts. of Thomas phosphate of 15 per cent. In the latter case 85lbs. and 1cwt., respectively, will replace the phosphoric acid. A medium crop of wheat requires about 31lbs. of potash and 23lbs. of phosphoric acid. You must therefore also calculate the quantity of manure which the intended crop will require in accordance with the respective presumptive need for a full crop. Plant food is not so easily taken up by barley and summer wheat, and these require, therefore, more manure; while oats, winter wheat, legumes, beets, potatoes, &c., are able to profit more by the plant food stored in the soil.

280. *Molasses for Pigs.*—Professor Albert, of Halle, reports on the feeding with this substance as very profitable. For every 100lbs. of live weight over the first 100lbs he gives 1lb. molasses, and P. Jorsz dissolves it in twice or three times as much hot water and puts into it the crushed corn for twenty-four hours. For fattening pigs he is not afraid of using 2lbs for every 100lbs. of live weight, for breeding sows not more than 1lb.

281. *New Sorts of Potatoes and Change of Seed.*—Mr. Huntemann states in the agricultural paper for Oldenburg that after rye stable dung and kainit was given in autumn, and twelve varieties were planted in equal number of tubers, the White Swan produced at the rate of 70,625lbs. per hectare, Professor Wohltmann 56,250lbs., others mostly less, but not suitable for the province. An exchange of seed he advocates earnestly, for the difference between a potato crop from tubers obtained from elsewhere and his own, that had been cultivated many years, was very great, actually three times better.

282. *Influence of Moisture on the Production of Seed.*—A. Mayer concludes that, except where the aridity of the soil prevents the production of seeds altogether, a smaller degree of moisture enhances the production of seeds. Where the soil had a capacity for keeping 35 per cent. of water he harvested 39 per cent. of rye, and with the greater moisture of 60, 90, and 95 per cent. he harvested 36, 33, and 30 per cent. respectively. The quality of the produced seeds is also very different, and with the increased moisture increases also the raw fibre and the total weight of the plant; but the contents, as well of nitrogenous as of non-nitrogenous nourishing matter, decreases. The same number of horse beans will weigh, when the ground holds 18 per cent. of water 113g.; with 38 per cent., 25g.; with 58 per cent., 48½g., and plants of barley respectively weighed 51g., 9·3g., and 10g. The different plants under cultivation ripen later with much moisture, and the maximum of productivity is obtainable in such a proportion as for oats with 90 per cent., wheat with 80 per cent., barley with 62 per cent., and horse beans with 58 per cent. of water.

283. *Professor Maercker Potato*, newly imported and distributed by me, is referred to in many letters appearing in agricultural papers of Germany. Although almost too highly praised by some, I think it ought to be suitable for our drier portions of the province, as it will only succeed well in dry seasons compared with many other new sorts, and is quite as suitable for light soil as for heavier.

284. Experimental Plots—The following is mainly upon the lines laid down by Dr. Paul Wagner, of the Darmstadt Agricultural Experimental Station. If you wish to ascertain whether commercial fertilisers will increase the productiveness of your land, measure equal plots, leaving one without such fertiliser and manure the other with one of the so-called complete manures. Any difference in the yield gives you an answer to the above question, but not whether it is profitable, unless you place the outlay against the income, and if you have been manuring too liberally the profit may disappear altogether, although the crop was magnificent. The above is the most simple way of ascertaining whether your soil requires manure; but it is after all quite unsatisfactory, for you ought to know which of the three chief plant foods—nitrogen, phosphoric acid, and potash—your soil is in want of. It may be only one of them, or two of them, and you may save the expense for the other one, or two. And, as everybody knows who has been farming or gardening, different crops require fertilising in different proportions, and thus it becomes necessary for the careful person to make many experiments. In the first instance, however, you may wish to ascertain which of the three plant foods does chiefly contribute to give you a better crop than without it, and for that purpose fifteen plots may be necessary to come to a trustworthy result. Select land that never before received manure or else that had received none for years and has attained a maximum degree of exhaustion, but even such soil is not equal in its manurial condition, or otherwise quite uniform, even in the small rectangular plots proposed, viz., quarter of a square chain each. You require for each test three plots in different parts of the experimental plot you have selected. Wagner proposes to divide the plots, not merely by strong pegs at the corners, but hoes along the lines, or leave the cords used for sub-division. It is understood that the plots should be selected on that portion of your land which seems most uniform in character and condition, and neither inferior nor superior to the greatest portion of your land. We have now three plots without an application of fertilisers, three to which we apply nitrogen, phosphoric acid, and potash in such quantities as may be deemed advisable, three more with nitrogen and phosphoric acid, three with nitrogen and potash, and three with phosphoric acid and potash. These several plots must be intermixed so that no two of the same kind join. At harvest time you may find that your soil is rich enough in potash or in nitrogen, so as not to require both of them or either of them, and that phosphoric acid with either of them is the fertiliser which is needed and will give you a profit. In South Australia phosphoric acid alone will frequently give you as good a crop, or at least as profitable a crop, as a complete manure, and for that very reason I think it would be advisable to make three more plots, which you might manure with phosphoric acid alone. After you have thus ascertained what your soil requires you should also see whether any lime or marl may yet improve it, especially where your soil is not of a light sandy nature. And now you can make, in the next year, further experiments in using the different kinds of fertilisers—for nitrogen, sulphate of ammonia, or nitrate of soda, or blood manure; for phosphoric acid, superphosphates, and bonedust, both of different kinds; Thomas phosphate, and guano, as well for its nitrogen as its phosphoric acid; for potash, kainit, muriate of potash, or sulphate of potash. These latter experiments are made with a view of using such a fertiliser which will give the greatest net profit. After you have made all these experiments you can still extend them with the greatest advantage by trying for the different cereals, root crops, or vegetables, the quantities required, which you may find detailed in many papers in our *Journal*, or elsewhere, and also how best to apply them; in fact, you may experimentalise many years, and you may doubtless after these form a more correct judgment of what to apply, and find that your credit side of the ledger will soon show substantial profits. As kainit and other salts very often set hard, it is in the first place perhaps necessary to break them up and pass them through a sieve of say $\frac{1}{16}$ in. mesh, and, to prevent them setting hard again, to mix them with sawdust. You will mix the manures together for each plot and place each sack on it. It should not be forgotten that Thomas phosphate must not be mixed with ammonia, nor superphosphate with nitrate of soda. If the mixture is too dry, especially in windy weather, some moist sand should be mixed with it to prevent it being blown over the boundaries. A top dressing of nitrate of soda must not be made unless the plants are quite dry. Kainit should be applied some months before sowing the seed.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Strathalbyn, Mr. B. Tucker; Port Germein, Messrs. J. R. Gluyas and J. Jerrett; Balaklava, Mr. E. Hanes; Meningie, Messrs. W. Robinson and A. J. Myren; Onetree Hill, Mr. Peter Taylor; Inkerman, Mr. J. Lomman.

Reports by Branches.

The Secretary reported receipt since previous meeting of twenty-nine reports of Branch meetings.

REPORTS BY BRANCHES.

Eudunda, January 30.

Present—Messrs. C. von Bertouch (Chairman), F. W. Paech, C. Wainwright, A. Kluske, E. T. Kunoth, E. Schier, C. L. E. Lutz, C. Pfeiffer, and H. D. Weil (Hon. Sec.).

EXPERIMENTS.—Golden Giant Side oat: Mr. Kluske reported this to be rather late and unsatisfactory; Mr. Schier thought better of it, although it was damaged whilst green by hot winds; both will try it again. Allora wheat from the Agricultural College: Mr. Kluske found it ripened earlier than Steinweidel, and seems to be very suitable for dry limestone country. Other members in the scrub country gave yields of Allora as 10bush. per acre (in addition to about 3bush. knocked out by wind); Purple Straw, 12bush.; Bluey, 14bush. A farmer near Sutherlands sowed five bags of Bluey and reaped 132 bags. It was sown very thinly.

Mount Bryan East, January 31.

Present—Messrs. W. Bryce (Chairman), T. Prior, R. Webber, H. Wilkins, T. Wilks, W. H. Quinn (Hon. Sec.), and one visitor.

DRILLED WHEAT WITH FERTILISERS.—Mr. Bryce thought that the broadcast wheat crops gave as good results as those that were drilled in with fertilisers in this district. Mr. Wilks said that when land is in good condition it does not require fertilising; but when it is worn out it would pay to use fertilisers.

FALLOWS.—In reply to questions Mr. Bryce gave his experience that re-ploughed fallow land produced 7bush. per acre, whilst similar land sown without ploughing gave only 3bush. per acre.

Port Lincoln, January 20.

Present—Messrs. S. Valentine (Chairman), R. Puckridge, George Dorward, J. P. Barraud, E. Chapman, and J. Anderson (Hon. Sec.).

WATTLE CULTIVATION. — Mr. J. P. Barraud read a paper on this subject:—

In an outside district like this, where by-products can only be disposed of in a limited market, wattle-growing in suitable localities should be the best auxiliary to wheat and wool growing. We have about eighty acres under wattle cultivation. The first planting of about twenty acres took place in the year 1887; another twenty acres was planted the following year, fifteen acres the next year, twenty-five acres two years later. The method we adopted in planting was to plough two furrows about 6ft. apart; the seeds were then sown on the furrow ridge about 6ft. apart, after having first been scalded by pouring boiling water on and allowing them to stand about twelve hours. The sowing was quickly performed by two smart boys keeping pace with the ploughman working a double-furrow plough. Our first stripping took place in 1894, and we stripped about 12 tons, which realised £5 per ton chopped. Stripping cost 25s. per ton, freight about 10s. per ton. Last year we stripped over 21 tons, which realised £5 12s. 6d. per ton; stripping at about the same cost, freight 10s. per ton, long, in bundles. This year about 8 tons have been stripped, which has been sold, *Acacia decurrens* at £5 12s. 6d., and Golden wattle at £5 5s. The reason the *Acacia decurrens* bark brought the highest price was because the sale was effected earlier in the season than the other bark. Last year we were unable to get an offer for the *Acacia decurrens*. Our experience in wattle-growing has taught us that a plantation should be thoroughly fenced against vermin and stock before planting; that the trees should be planted 10ft. to 12ft. apart; that wattles will not grow large enough to strip on very poor land, especially if the natural herbage is not first destroyed; that it would pay to spend extra time in planting—if a little wood ashes were worked into the soil before the seed is planted it would give the young plants a splendid start; that to secure early maturity it is absolutely necessary that the young trees should not receive a check—a few inches nipped off the top of a young tree will put its growth back fully twelve

months; that sheep can safely be grazed in the plantation after the second year, provided the trees have made normal growth. Although our plantation consists of eighty acres it includes twenty acres of very poor land, which was only indifferently cleared, and on which none of the wattles have grown large enough to strip. I consider I can fairly strike it off and call it sixty acres. Thus our return can be given as under:—Forty-one tons sold at an average of £5 5s., £215 5s.; stripping, freight, cartage, &c., £2 5s. per ton, £92 5s.; leaving a net profit of £123. We estimate that we have now taken one-half of the bark off our plantation, and if the same price and conditions exist in the future we will obtain £246 from sixty acres of wattles in the course of about twelve years. We also consider that, guided by the experience we have gained, we could reasonably expect to increase those net returns by 100 per cent., thus giving £492 profit on sixty acres in ten years. This result could be obtained on an old worn-out wheatfield and by a farmer who could do much of the work himself, such as fencing, planting, carting, &c., but even if the whole work had to be paid for, wattle-growing should prove more profitable than grazing the land with sheep.

Lucindale, January 21.

Present—Messrs. E. Feuerherdt (Chairman), S. Tavender, H. Langberg, W. Dow, A. Lobban, A. Dow, E. E. Dutton, and A. Matheson.

OFFICERS.—Mr. E. E. Dutton was appointed Hon. Secretary in place of Mr. H. J. Decble, who has left the district.

EXPERIMENTS.—Mr. W. Dow reported Gordon Giant oats indifferent, with good straw but poor heads; might be useful for hay. Dart's Imperial wheat was indifferent; but Mr. Langberg said he had sowed 17lbs. seed with good results.

PEACH APHIS.—Messrs. Newman and Tavender reported peach aphis very prevalent this season, and no one appeared to have been successful in dealing with this pest.

FOREST TREES.—Members are desirous to know what varieties of forest trees are best suited to those parts of the district where the soil is fairly rich, with water generally within 2ft. of the surface.

GREEN CROPS.—The Chairman read the following extract from *Chemistry of the Farm* by R. Warington, F.R.S.

The most usual plan for bringing land into condition for the growth of cereals is the cultivation of green crops. These may be ploughed in, forming what is termed green manuring; or consumed on the land by farm stock; or the crop may be removed, consumed in cattle sheds or in the farmyard, and the resulting manure brought on to the land. The principle in every case is that the constituents of the crop shall be returned to the soil. Let us suppose that land is laid down with grass and clover seeds, and after two or three years is ploughed up and a cereal crop taken. Whilst the land is continuously covered by vegetation the loss of nitric acid by drainage will be reduced to a minimum. If the grass is fed off on the land the surface soil will at the end of three years be considerably enriched both with ash constituents and nitrogen. The former have been collected from the subsoil by the roots of the crop and returned to the surface soil as animal manure. The latter includes the accumulated receipts from the atmosphere and subsoil during the three years, minus the quantity lost by drainage and that assimilated by the animals. The accumulated nitrogen will be chiefly in the form of grass roots, stems and humus. When such land is ploughed up the vegetable matter and humus are oxidised, and gradually yield their nitrogen as nitric acid. Such a mode of cropping has advantages over a bare fallow: 1. The land is turned to profitable use, food being produced for the farm stock. 2. Both ash constituents and nitrates are collected from the sub soil and brought to the surface. 3. Nitrogen is acquired from the atmosphere by the crop, as well as by the soil. This is especially true if leguminous plants (peas, beans, clover, &c.), are grown. 4. The nitrogen collected is kept in an insoluble form as vegetable matter, and consequently cannot be washed away, but accumulates in the surface soil to a greater extent than is possible in a bare fallow. 5. Humus is produced in considerable quantity, the beneficial actions of which have already been noticed. Leguminous crops have a special power of acquiring nitrogen from the atmosphere by means of their root tubercles, and are hence of the greatest value in a rotation. The accumulation of nitrogen in the surface soil in the form of roots, stubble, and decayed vegetable matter is, in the case of a good crop of clover, so considerable that the whole of the above-ground growth may be removed as hay and the land yet remain greatly enriched with nitrogen, and in an excellent condition for producing a crop of wheat. The growth of leguminous crops is the most important means which a

farmer possesses for enriching his arable land with nitrogen. The ploughing in of green crops has some advantages over the feeding of crops on the land. By this mode of proceeding the whole of the crop is returned to the soil, whereas in feeding a small part of the nitrogen and ash constituents is retained by the animal. The characteristic advantages of green manuring lies, however, in the large amount of humus which the soil acquires. All the carbon which the crop has obtained from the atmosphere is in this case incorporated with the soil, instead of being consumed by the animal. Green manuring is thus especially adapted for light sandy soils, which need humus to increase their retentive power. It is employed with great advantage to fertilise barren soils in hot climates.

Watervale, January 23.

Present—Messrs. C. A. Sobels (Chairman), G. Hunter, H. Croft, E. Treloar, S. Solly, L. Buring, J. Thomas, W. Smith, and E. E. Sobels (Hon. Sec.).

SEASON.—Members reported that although the weather had been exceptionally cool, with good summer rains, the fodder crops were poorer than for years past. The boisterous winds have almost destroyed all hope of an apple crop. Members thought the reason for the fruit falling so readily was that the trees were still suffering from the effects of the past dry seasons. Mr. Solly showed fine specimens of some new varieties of plums.

FRUIT INSPECTION.—Mr. Croft thought some active steps should be taken to secure the appointment of an inspector of fruit for this district. At present exporters were put to great inconvenience, having to take their fruit to Clare or Auburn to get it inspected.

BRANCH SHOW.—The fourth annual show in connection with the Branch, to be held on March 1, promises to be the best yet held.

Elbow Hill, February 1.

Present—Messrs. E. Wake (Chairman), J. Harvey, C. G. Ward, H. T. Styles, J. Foulds, J. Elleway, T. Story, W. Ward, C. L. DuBois, G. Wheeler (Hon. Sec.), and three visitors.

CEREAL EXPERIMENTS.—The Chairman tabled some fine plants of Golden Giant Side oats, from Bureau seeds. He considered it a variety worth growing. He also tabled sample of Marvel wheat, grown from seed imported by Mr. G. L. Ware from America. It was a very prolific variety, but the grain was of poor quality, and hardly fit for milling purposes.

CORNSACKS.—The Chairman initiated a discussion on this subject. He considered the farmers were being unfairly treated by the merchants. They lost 4d. on every bag they used. He thought they should combine and see whether they could not alter the present practice. The Farmers' Union could well take the matter up. If the farmers would only work more together there were many practices that could be altered for the better. Mr. DuBois did not think any alteration in the practice *re* wheat sacks practicable. Some members thought it would be much more convenient if 2bush. bags were used instead of 4bush. bags, and on a vote being taken the majority favored the smaller bag.

WHEAT YIELD.—Members were of opinion that the average of the district represented by this Branch was between 5bush. and 6bush., Beinke's Monarch wheat giving the best returns in almost every case, both as regards quality and quantity.

POULTRY.—The Hon. Secretary wished to know what to give fowls to cause them to lay harder-shelled eggs. Although there was plenty of lime about, his fowls still lay eggs with shells too soft to handle. Mr. Styles said ordinary bonedust was a good thing to give them. Mr. Elleway thought in-breeding largely the cause of this trouble. The Chairman considered that, as a rule,

farmers did not pay sufficient attention to the improvement of their poultry. He favored the introduction of Indian Game and Malay blood. Mr. Ward favored the Minorcas for egg laying. He knew of a hen which laid 230 eggs in one year. The Hon. Secretary considered their ordinary fowls would give as good returns as any pure breeds if they were properly looked after.

RAINFALL.—For six months ending December 31, 4·88in.

Hartley, January 27.

Present—Messrs. C. Harvey (Chairman), J. B. Sanders, W. Stanton, J. Stanton, H. Reimers, A. Thiele, J. Jaensch, T. Jaensch, W. Klenke, and H. Lehmann (Hon. Sec.).

BEST VARIETIES OF WHEATS.—Considerable discussion took place on the question as to which were the best varieties of wheat for this district. Several members tabled specimens of the varieties grown by them, and gave their experience with them. The following results from the late harvest were recorded:—Fallow land: Mr. W. Klenke got the following returns:—Steinwedel, 16bush.; Purple Straw, 15bush.; Early Para, 12bush.; Mr. J. Jaensch got 15bush from Early Para; Mr. J. B. Sanders got 17bush. from Square Head; Mr. A. Thiele 10bush. from Purple Straw, and 13bush. New Zealand Longberry. Land not fallowed: Mr. T. Jaensch had 9bush from Purple Straw and 4bush. Early Para; Mr. H. Reimers 8bush. Purple Straw and 6bush. Early Para; Mr. J. Jaensch 8bush. Purple Straw; Mr. J. B. Sanders 9½bush Leaks' Rustproof; Mr. A. Thiele 6bush. Purple Straw. Mr. Harvey had 14bush. from Purple Straw and 10bush. from Early Para, but no record given as to whether land was fallowed. Members considered Purple Straw, Steinwedel, and Tuscan wheats best for this district; the Steinwedel being particularly suitable, owing to being early and yielding well. The early varieties were generally considered to be the best for this locality.

Paskeville, January 28.

Present—Messrs. H. F. Koch (Chairman), A. E. Wehr, J. E. Price, A. Goodall, G. Meier, and J. H. Nankervis (Hon. Sec.).

WHEAT GRUBS.—The Kulpara District Council sent £1 to the fund for destruction of the beetles which produce the destructive wheat-grubs.

PETATZ SURPRISE WHEAT.—Resolved to give this wheat a good trial during the coming season.

LIVE STOCK.—A good discussion took place upon this subject, and it was unanimously agreed that it is desirable to effect improvements in this direction. At next meeting members will consider the question of procuring a good dairy breed of bull for the district.

Norton's Summit, January 28.

Present—Messrs. J. Jennings (Chairman), J. Bishop, J. J. Bishop, J. Pellew, A. Smith, J. Hank, and W. H. Osborne (Hon. Sec.).

FRUIT FLY.—Mr. Jennings took exception to the report in October *Journal*, page 195, of his inquiry *re* possibility of the eggs of the fruit fly deposited in bananas being destroyed by fumigation. The report made his remarks appear ridiculous; what he said was "Seeing the fly deposits its eggs with an ovipositor beneath the rind of the fruit, would the withdrawal of the ovipositor cause the skin to contract again, or would it leave an incision; and is it possible

that so light a body as gas could be driven into the orifice in spite of the exudation natural to an incision in the fruit?" [The report in question was written from notes taken by an expert stenographer.—GEN. SEC.] Members considered the article in the same issue, page 269, was intended to mask the fears of our orchardists, and think that it proved too much and therefore fails in its purpose. They wished to know whether the fact that the Mediterranean fruit fly had travelled through various climates to reach West Australia, did not lead them to expect that the Queensland fruit fly would probably become acclimatised in other than tropical countries. Members wished to know whether all bananas arriving in South Australia are fumigated, and are the Central Bureau prepared to declare that fumigation destroys the larvæ of the fruit fly. [As bananas are not fumigated at all in South Australia, the question as to whether the Central Bureau are prepared to "authoritatively declare that fumigation destroys the larvæ of the fruit fly" scarcely need be answered.—GEN. SEC.]

Naracoorte, January 21.

Present—Messrs. O. Hunt (Chairman), H. Smith, J. Wynes, S. Schinckel, H. Buck, E. C. Bates, and D. McInnes (Hon. Sec.).

SOUTH-EASTERN CONFERENCE.—It was decided to hold the Annual Conference of South-Eastern Branches on March 29, instead of March 15 as previously arranged. The Hon. Secretary wrote that Professor Lowrie, and the Dairy Instructor, and the Inspector of Fruit had promised to contribute papers for the Conference. The various committees were making good progress with their work, and the ladies of the district had responded well to the request for assistance in entertaining the visitors. It was decided that three sessions be held, and everything is promising for a very successful gathering.

Richman's Creek, January 23.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, A. Nicholson, W. Rodgers, J. M. Kelly, M. Hender, P. J. O'Donohue, J. J. Scarle, J. J. Gebert, W. J. Wright, and J. McColl (Hon. Sec.).

WHEAT-GROWING.—Hon. Secretary reported on experiments with wheats. Ten varieties were sown on June 11, in small plots, viz., Twenty Weeks Bearded, King's Solid Straw, Baker's Early Bearded, Allora, Early Para, Carmichael's Eclipse, Red Straw, Dart's Imperial, Goose, and White Monarch. Little difference was noticeable in the early part of the season, but in September the earlier varieties showed more growth, especially Baker's Early, which came in ear a fortnight before the others. King's and Twenty Weeks came next. White Monarch and Goose, received from the Central Bureau, proved failures, blighting badly. Four pounds of Dart's Imperial returned 85lbs. Two pounds of Baker's Early gave 50lbs. Five acres of King's, on fallow, averaged 15bush. Twenty Weeks, 12bush. on fallow and 8bush. on stubble. Carmichael's Eclipse yielded 9bush. on fallow. Allora, on stubble, 7bush., that growing on fallow being cut for hay, and giving 1½ tons to the acre. Red Straw gave 8½bush. on fallow and on stubble 6bush. The bulk of the crop consisted of Red Straw and Twenty Weeks, the proportion of the fallow being about two-fifths of the whole, and the average return 8bush. Up to beginning of June rainfall only 2.1in., but during that month 5.56in. were recorded; in July 1.14in.; in August 4.22in.; while only 88 points were recorded during the last four months of the year. Strong northerly winds prevailed from middle of September to end of October, which, with occasional frosts, accounted no doubt for the failure of the crops, for those

that promised best in September suffered most severely in the end. The Chairman said he had reaped 13bush. to the acre off King's wheat, and none of the other wheats came near it for yielding. Messrs. Nicholson, Knauerhase, and Gebert, had obtained most success with Steinwedel, while with Messrs. Kelly, Hender, and Rodgers, Twenty Weeks wheat had proved the best. Mr. Searle favored Baroota Wonder. It was estimated that the district would average 4½bush. Members complained of the prevalence of bunt, even when the seed was well pickled, especially in blighted patches. Mr. Gebert said he had pickled his seed two or three months before sowing, using 14ozs. of bluestone to the bag, and his crop had not been so free from smut for years. If the wheat was thoroughly dried after pickling very little of the seed would be destroyed.

Kapunda, February 4.

Present—Messrs. W. Flavel (Chairman), J. P. Orchard, G. Teagle, Pat. Kerin, J. A. Schultz, T. Scott, jun., Peter Kerin, W. M. Shannon, H. King, J. O'Dea, J. H. Pascoe, and T. Jeffs (Hon. Sec.)

FOWL TICK.—A discussion on remedies for fowl tick took place. It was stated that this pest existed in the poultry yards of the district. Various remedies were suggested, including sheep dip, lime, tar, &c.

BUNT.—Mr. King stated that he noticed that land manured with Thomas phosphate was more affected by bunt than other land, though he could not see how the manure could make any difference. Several members stated pickling was not always a preventive, and some suggested that climatic conditions influenced the result.

Port Elliot, January 28.

Present—Messrs. J. Brown (in chair), H. Powell, E. W. Hargreaves, J. McLeod, J. O. Whitmore, H. Green, J. Davidson, E. Hill (Hon. Sec.), and T. Hardy from Central Bureau.

DAIRYING.—Mr. McLeod directed attention to complaint amongst dairy cows in this district. Several persons had lost animals within a few days of the first appearance of the disease. Stockowners conversant with most cattle complaints were unable to determine the cause of the trouble. It was decided to ask the Chief Inspector of Stock to visit the district when well-defined cases of the disease are again met with. Mr. J. Davidson, manager of the local butter factory read a paper, of which the following is the substance:—

I need make no apology for introducing a subject of so great importance in a district so essentially suited for keeping of dairy cows and producing milk in large quantities. The industry has progressed with leaps and bounds during the past seven years, and though it has sustained a temporary check during recent years of drought, there is still a brilliant future ahead, but we can only expect it to develop and prosper just in proportion to the amount of intelligent thought and skill that will be brought to bear on the selection of herds, production of milk, and the manufacture of dairy products. The producer must hasten to apply science to his calling with the same vigor that the manufacturer is to-day embracing scientific research. In cases where dairy farming has been carried out on a systematic basis we hear of no failures. There are exceptions where farmers allow the cows to find food how they can, neglecting the question of feed and breed. In order to succeed he must keep a sufficient number of cows, and provide summer and autumn feed, so as to keep up an unbroken supply of milk, and ensure having at the end of the year a balance on the right side of the book. It is patent to all that almost as much time and trouble is involved with a few cows as with a larger number. If we only launch out half-heartedly in any business we are bound to fail; we should go in extensively. The continued cropping of land in other colonies is fast giving way to dairy farming and mixed husbandry. Experience has shown that the farmer who adopts a system of mixed farming fast rises to the top as a successful agriculturist. He judiciously blends with his year's produce a little of everything; while he attends to the

rotation of crops he does not neglect the dairy and the production of necessary fodder. It is commonly known that an average cow will give about 2galls. of milk per day for seven or eight months in the year. In eight months she will give 468galls., which, at an average price of 3d. per gallon amounts exactly to £6 0s. 10d. As a fairly good cow can be bought for £5, it is evident a cow will more than pay her first cost in a season, leaving out the profits from rearing calves and pigs on skim milk. In what other investment, I ask, could you earn the capital invested in one year's operation? One of the commendable features about dairying is that the profits are quick and sure—no risk as with grain-growing, often a poor crop and low prices.

The dairyman wants a cow suitable to climate, soil, and elevation; large rather than small; a great eater, drinker, and digester, of a contented disposition, to give ten months in the year a large quantity of rich milk—not less than six times her own weight. These are the main essentials of a dairyman's paying cow. I do not purpose naming any particular breed as the best, except in so far as just stating that the Jersey leads in the production of butter fat, whilst the Holstein takes the palm for quantity of milk. A very important feature in a dairy cow is that of responding to good feeding and kind treatment by an increased quantity of milk. All the profit that comes from a cow is derived from the food over and above two-thirds required to sustain life. Hence it should not be difficult to calculate the amount of milk that must be got in order to make it pay. It is infinitely better to keep a few well-selected cows than a large mixture of ill-bred, unprofitable animals. They consume as much as the good ones, and only yield half the profit in the pail. Every farmer should adopt a means of ascertaining the value of his cows as milkers and producers of butter fat. The most reliable test he can adopt is that "unsparing critic" the Babcock. Fatten and sell to the butcher all weedy animals, and breed only from good sires and reputed milkers possessing high butter qualities, and a good herd will be got in time. Careful attention should be exercised in providing an abundance of succulent nutritious food for cows. It pays to feed well. To guard against a shortage of feed at certain times in the year, provision should be made for growing green food, such as sorghum, maize, and lucern, and have the farm provided with a silo. The cultivation of certain plants as crops of green fodder is now a feature of all progressive dairying countries. Even with the best pasture there is a risk for unbroken milk production that cannot be entertained nowadays. The question is one of no back-going, but continual progress. The times are too serious to let well alone, and as South Australia possesses soil and climate admirably adapted for such culture, and with science and practice applied, the possibilities are great.

The payment of milk by its relative value is a question that affords food for a good deal of controversy. The advisability of buying milk according to results is being fully recognised by leading dairymen in all the colonies. Hitherto milk has been about the only important commodity that has not been purchased according to quality, and this fact has not only fostered dishonesty, but has prevented the improvement of dairy herds. The Babcock is an absolutely reliable indicator of the butter and commercial value of milk. The fact that it has been in use in America for the past ten years and in the principal factories in the colonies for over five years, is sure evidence of its reliability. If a sample of milk is tested by the Babcock and a portion of the same milk subjected to a chemical analysis the butter fat results are the same. From whatever point the subject is viewed the conclusion is inevitable, that the payment of milk by results is an enormous advantage to the factory and to the supplier; it places the purchase of milk on a purely commercial basis; prevents adulteration, gives the honest and progressive dairyman his fair due, and creates an incentive to further effort. Above all it will be beneficial to the country at large, in that it will bring about a greater yield of butter from a given acreage by inducing attention to breed, feeding, and the proper treatment of cows.

Mr. Hardy supported Mr. Davidson as to the necessity for working under scientific principles, not only in dairying but in other industries. In reply to request, Mr. Hardy gave an interesting account of some of his observations during his recent trip.

THE LATE CHAIRMAN.—Feeling reference was made to the loss sustained by the death of Mr. C. H. Hussey, one of the founders of and the Chairman since the inception of the branch. It was decided to forward a letter of condolence to the family of the late Chairman.

Gawler River, January 27.

Present—Messrs. A. M. Dawkins (Chairman), J. Hillier, J. Badman, A. Bray, D. Humphries, F. Roediger, H. Heaslip, H. Roberts, H. Roediger (Hon. Sec.), and three visitors.

STANDARD BUSHEL.—The Hon. Secretary reported having forwarded sample of present season's wheat to the Chamber of Commerce, and tabled a standard sample of this season's crop as received from the Chamber. Members considered it inferior to the average of the wheat reaped in this district.

EXHIBITS.—Mr. A. Bray tabled several large bunches of Zante currants, and reported that the currants had set well this year, and he would have a good crop. Mr. Hillier showed samples of Robin's Branching sorghum and amber cane. The former was very hard, and the cows would not touch it, though they ate the amber cane very readily. Mr. Badman tabled good cobs of horse-tooth maize.

Stockport, February 8.

Present—Messrs. T. Megaw (Chairman), P. Hogan, S. Rodgers, T. Howard, M. Connolly, F. Watts, G. Burdon, D. G. Stribling, C. F. Jorgensen, J. Murray (Hon. Sec.), and four visitors.

HARVEST REPORTS.—Mr. Stribling reported that his hay crops did not give good return; a small piece of barley returned a good crop; 105 acres of Early Para and thirty-seven acres of Early Pearl wheats drilled in with Thomas phosphate returned 13bush. to the acre, although they suffered severely from hot winds and storms; another paddock of eighty-five acres of Purple Straw drilled in with $\frac{3}{4}$ cwt. English super. per acre on the 1st May was greatly affected by the hot weather, but returned about 20bush. per acre; 182 acres of Purple and Red straw drilled in with English super. and Thomas phosphate went in badly and returned 14bush.; seventy-four acres drilled in with English super. and Thomas phosphate (super. proving to be the better) were badly blighted and smutty, and returned over 14bush. Mr. Hogan reported that forty acres of Purple Straw, drilled in with $\frac{1}{2}$ cwt. English super., and sown in April, returned 14bush. to acre, having lost about 6bush. by storms; Early Para and Purple straw broadcasted without manure returned 10bush. and 16bush. to the acre respectively, having lost about 4bush. to the acre through storms. Mr. Jorgensen reported that Early Para broadcasted without manure came out very thin, not stooling properly and suffered very much from storms and returned 6 $\frac{1}{2}$ bush.; forty acres of fallow was not much better than that ploughed and sown. Mr. Connolly, thirty-four acres of Broad Leaf wheat broadcasted with 1cwt. Thomas phosphate returned about 14bush., having resisted the storms very well; thirty acres Red Straw with 1cwt. Thomas phosphate was not so good as the Broad Leaf; that sown without manure returned about 5bush. Mr. Watts broadcasted Purple Straw with 1cwt. guano super., returning about 14bush. after having lost 4bush. per acre through storms; in the same paddock Red Straw returned 12bush.; Broad Leaf wheat sown in reddish clay, setting down hard after rain, returned 9bush.; Red Straw, sown with 90lbs. kangaroo brand guano, returned 19bush.; Early Para, sown with 1cwt. kangaroo brand guano, returned 15bush. Mr. Rodgers sowed one bag of barley which returned twenty bags; broadcasted 100 acres of wheat with 90lbs. of kangaroo brand guano to the acre and reaped between 12bush. and 13bush. Mr. Burdon ploughed and sowed about thirty acres without manure, which returned 5bush. per acre.

Albert, February 4.

Present—Messrs. J. Brewin (Chairman), G. Haggard, H. Lane, G. Acres, F. Stevens, W. H. Clarke, A. B. Struther, G. Holmes, G. S. Munn, T. Cooper, R. C. Rasmussen, J. Wetherall, H. L. Smith (Hon. Sec.), and two visitors.

OFFICERS.—Mr. Brewin tendered his resignation as Chairman and Hon. Secretary, on account of his leaving the district. Mr. J. Wetherall was elected Chairman.

BINDER v. STRIPPER.—Considerable discussion took place on the relative merits of these machines. Members were of opinion that some portion of the crop should be harvested by means of the binder, but the bulk should be taken off by the stripper.

CEREAL EXPERIMENTS.—Mr. Munn tabled samples of wheats from Bureau seeds. He sowed $\frac{1}{4}$ oz. of Goose wheat and reaped $1\frac{1}{2}$ lbs. of very poor grain; $\frac{1}{4}$ oz. Club wheat yielded $6\frac{1}{2}$ lbs. of fair grain; $\frac{1}{4}$ oz. Steinwedel gave $3\frac{1}{2}$ lbs., sample fair. Oats were a total failure, and very smutty. Rainfall during growth, 5.48 in.

Appila-Yarrowie, January 30.

Present—Messrs. J. Wilsdon (Chairman), J. C. W. Keller, J. O'Connell, J. Daly, J. H. Klemm, and C. G. F. Bauer (Hon. Sec.).

GLADSTONE CONFERENCE.—Matters in connection with the forthcoming Conference of Branches were dealt with.

POULTRY.—It was decided to ask the poultry expert to give a lecture at Appila-Yarrowie at an early date.

RAINFALL.—Recorded for 1898, 13.25 in.

Morphett Vale, February 8.

Present—Messrs. L. F. Christie (Chairman), T. Anderson, J. Bain, J. Depledge, J. Spriggs, A. Ross Reid (Hon. Sec.), and two visitors.

BLUESTONE FOR PICKLING.—Mr. Depledge tabled two samples of bluestone—one of English and one of colonial manufacture. He strongly advised the use of the English article, having had very much better results from its use than from the colonial article. The difference between the two samples was very marked, the English article being hard and dark, the colonial more whitish and soft.

MANURES.—A discussion took place on drilling and manuring. Most of the members agreed that manuring without fallowing the land was of little use. The Chairman said he put on 150 lbs. super. per acre on unfallowed land, and only got 15 cwt. of hay per acre. The Hon. Secretary reported that from some of his poorest land he obtained nearly 3 tons of hay per acre. The land was fallowed early, and seed drilled in with 2 cwt. super. per acre. On better land, ploughed up in April, and manured similarly, the return was only $1\frac{1}{2}$ tons. A strip of land in the first paddock was left unmanured, and the crop was not worth more than 15 cwt. per acre. One resident averaged 3 tons 6 cwt. from 150 acres of well-fallowed land.

Davenport, January 27.

Present—Messrs. W. J. Trembath (Chairman), R. Fawcett, W. Penna, J. Hodshon, J. E. Lecky, J. Roberts (Hon. Sec.), and three visitors.

ROADSTER STOCK.—Mr. Lecky read the following paper upon "The Improvement of Roadster Stock":—

It is a foundation principle that only the very best and purest stock is really adapted to the end in view, and it costs no more to feed a well-bred animal than it does a mongrel. Besides being more satisfying to the eye, the well-bred horse will command a much better price if the owner wishes to sell him. Whilst a deal of care has been devoted to race horses, with a view to increase of speed, it may be admitted that many of the horses used to produce racers, though speedy, lack that symmetry that is necessary when they are used for crossing as sires, when their racing career is over. Years ago much more attention than at present was given to roadster stock, and such horses as the old Norfolk Hero, owned by Mr. T. Dodd, crossed with

roomy mares, produced horses which it was a pleasure to drive. The Norman Percheron horses, well-known and popular in France, have been introduced into America with splendid results, and anyone intending to enter into the business should consider the merits of the breed. The Norman Percheron's characteristics are:—Head, short; brow broad; hollow profile between the eyes and nostrils, resembling the Arab; neck long, well arched, and heavy, but, like the head, not disproportionate to the general bulk; back, short, well-ribbed up, and round barrelled; legs particularly short, from the knees downward; heavily haired, but not such shaggy fetlocks and feet as this would indicate; sinews, iron-like; feet, hard, sound, and apparently insensible to disease; height, from 14½ hands to 15½ hands; grey is the characteristic, almost the only color. They are unequalled for hard work, as also for quickness of movement at heavy draught, and capable of maintaining a good rate of speed for long journeys, or making short ones with astonishing rapidity. One, drawing a light vehicle, is known to have made fifty-five and three-fifths miles in four hours thirty-four minutes.

Another plan would be to import some good Cleveland bay stallions, and mate them with carefully-selected roomy mares already in this colony. The pure Cleveland bay is a tall, powerfully-built, bony animal, averaging 15 hands 3in. in height, rarely falling below 15½ hands or exceeding 16½ hands, head bony, lean and well set on, crest and withers invariably good, round barrel, clean limbed, and a coat like satin. They are active powerful animals with excellent capabilities for draught and great endurance; speed from six to eight miles per hour at a trot, or ten to twelve miles at a gallop under any weight. It is a popular opinion with some people that any old mare which is past work is good enough to breed from. This is a grave mistake. The mare should be free from disease, such as ringbone, spavin, splints, poll-necked, cow-hocked, &c. Blemishes caused by accident cannot always be avoided; a mare should not be allowed to breed till three years old, if kept till four all the better. The reason for this is, the mare carrying a foal before she is fully developed requires all the nourishment that goes to the foal; neither should the mare be too old, especially if her constitution has been weakened by hard usage and insufficient feeding. Another point worth remembering is that the mare should be larger than the horse. Where experiments have been made by using large stallions to small mares, the result has been a nondescript animal, with very little beauty and utility. It will be well to remember also that any quality desired which is deficient in one should be supplemented in the other if possible, and while believing that there is money in raising this kind of stock, I recognise also there would be considerable outlay at the start, if started on a large scale. Steps should at once be taken to have all stallions which are used for hire inspected by a qualified vet., and, if not sound, they should not be allowed to perpetuate their species. They should be licensed annually. This would be the first step to improving stock of all classes, and would not interfere with the liberty of the subject. As far as the person on the farm or station was concerned, he could rear and keep what stallions or mares he pleased for his own use, but whether they would be a marketable commodity is another question.

Members agreed there is plenty of room for improvement of roadster stock. Whilst admitting the good quality of Percherons, one speaker thought their grey color would militate against their popularity.

Renmark, January 24.

Present—Messrs. H. Showell (Chairman), W. H. Waters, R. Kelly, J. O. Gubbins, R. V. Bostock, M. Chapman, and E. Taylor (Hon Sec.).

MANURING OF LUCERN AND VINES.—The Chairman read the following letter from Professor Lowrie:—"The Veile's formula per acre for lucern is as follows:—Superphosphate, 352lbs.; muriate of potash, 176lbs.; gypsum, 352lbs. As our own conditions are somewhat different, I have recommended elsewhere the following formula per acre:—Superphosphate, 4cwts.; gypsum, 5cwts.; and wood ashes, at a later date, 6cwts., or even as much as half a ton where it is easily available. Gypsum being plentiful at Renmark, I think it might be applied in heavier quantity, half ton to 15cwts., or even a ton per acre. There is no fear of the wood ashes and gypsum being antagonistic, and I believe wood ashes also might be applied shortly after the superphosphate with impunity, as in a very few months the superphosphate reverts to the biphosphate or to the normal phosphate in the soil. One cannot give dogmatically a given formula as best for any definite particular case. Experience, which can be gained by the grower by applying different quantities to measured acres on the

block of lucern, side by side, is the sure way to determine the most profitable quantity as well as the most profitable material to apply. I suggest superphosphate for limestone brash, such as you have in places at Renmark; but where lime is wanting I think you would find bonedust most profitable to use, your soil being quite deficient in phosphoric acid. Apply 6cwts. to 8cwts., to begin with, gradually reducing the quantity as you find possible to, say, 3cwts. per acre. For a while I should expect bonedust or superphosphate alone, or applied with gypsum, will enable you to cut maximum crops. After a time some potassic manure will be required, and by dressing a small part of the area from time to time you will soon discover when it is demanded by noticing when the returns are appreciably increased by it. As I do not know what your crops are, I speak very haphazardly."

The following letter on manure for vines from Professor Perkins was also read:—"The sandy land at Renmark may, probably, benefit by the use of potassic manures; nitrate will give good results where growth is weak. There is no objection to mixing gypsum and wood ashes if it is found more convenient to apply them jointly. It should be remembered in the case of vines that the effect of manure on the crop is usually only noted the second year."

Mundoora, January 27.

Present—Messrs. W. Aitchison (Chairman), R. Harris, T. Watt, W. D. Tonkin, W. J. Shearer, J. J. Vanstone, G. Haines, and A. E. Gardiner (Hon. Sec.).

STANDARD BUSHEL.—Mr. Harris considered members of the Agricultural Bureau should have something to do in annually fixing the standard average weight of the bushel of wheat. The branches should discuss the subject very early in the season, appoint delegates to meet and further discuss the matter, and these delegates should finally elect from amongst themselves a certain number of representatives to meet the Corn-Trade Section of the Chamber of Commerce when the question of the average weight of the latest season's crop is to be settled. Members generally thought the average was fixed too high this season, and should have been 62lbs. per bushel in place of 63lbs.

EXPERIMENTS.—Mr. Tonkin had found Early Para wheat best suited to his circumstances of soil and season. Mr. Harris found Nonpareil gave best results. Steinwedel went down very much with hot winds during spring. Mr. Haines found Pride of Barossa best. Steinwedel was blown down and shaken out with rough winds. Mr. Vanstone's best variety was Purple Straw; Steinwedel only fairly good.

BUNT.—A good deal of discussion took place upon bunt in wheat, and whilst some members had a full knowledge of the cause of the disease, others seem to have failed to understand the reasons for its appearance. [They should carefully read the article upon "Bunt and Smut" in the February, 1899, issue of the *Journal of Agriculture and Industry*.—GEN. SEC.] Mr. Harris mentioned a case where a farmer forgot to lift the lever when sowing seed with a seed and fertiliser drill, and went one round with it. After the crop came up he discovered his error, and went over that part again, sowing seed, rain having fallen meantime. The later sown was much bunted at harvest time, but the rest of the crop, sown before rain, was quite free from bunt. Mr. Vanstone said a neighbor, last season, pickled some badly bunted seed—quite one-third—with very strong bluestone solution, and reaped a nice clean crop. Members consider it very risky to sow bunted seed, and in all cases the seed should be run through the machine to blow out the bunt balls.

Naracoorte, February 11.

Present—Messrs. O. Hunt (Chairman), S. Schinckel, G. Greenham, J. D. Smith, H. Buck, H. Smith, D. McInnes (Hon. Sec.), and one visitor.

VISIT TO HOMESTEAD.—This meeting was held at the residence of the Chairman. The orchard, which contains a mixed assortment of about 800 trees, as well as a number of vines, was inspected, and the various fruits sampled. Mr. Hunt explained various matters concerning the pruning and treatment of the trees.

CONFERENCE.—Matters in connection with the forthcoming Conference of Branches were dealt with.

STOCK COMPLAINTS.—Mr. Schinckel reported that one of his young cows had a swelling under the throat, but with treatment it had recovered. Mr. Smith had had a cow similarly affected. The gathering started on the side of the throat and spread underneath, where it broke. He bathed it well with hot water and the animal had recovered. Mr. Buck reported one of his horses had broken out in pimples from the head to the shoulder. When the animal became heated the pimples disappeared. Mr. Schinckel attributed this to over-heating, and advised the use of sulphur. The blood was probably out of order. Mr. H. Smith considered it a good thing to give the horses a little saltpetre and sulphur once a week in their food. This would probably prevent these ailments. The Chairman reported cases of impaction amongst cattle in the district.

STAR THISTLE.—A discussion took place on star thistles, and the Chairman stated it was of no use in this district cutting them before the first flower had gone off.

Holder, January 28.

Present—Messrs. F. A. Grant (Chairman), E. Crocker, J. Green, N. Morgan, H. Blizard, W. Watt, and J. J. Odgers (Hon. Sec.).

SEED EXPERIMENTS.—Mr. Green reported that Florida beans proved a failure, although given every attention; cow peas were doing splendidly.

ENSILAGE.—Mr. Grant read extracts from papers dealing with the making and usages of ensilage. Special care should be taken that sour ensilage is not made in close proximity to the dairy, and that it is not handled just prior to milking, otherwise it will taint the milk.

Lyrup, February 7.

Present—Messrs. A. Thornett (Chairman), T. Nolan, W. Healy, D. J. Bennett, A. Pomeroy, W. H. Walling, A. Weaver, T. R. Brown, D. Thayne, W. H. Wilson (Hon. Sec.), and four visitors.

EXHIBITS.—Mr. Healy tabled for identification a number of onions averaging 18ozs. in weight; they were grown without any special manuring or treatment, but were irrigated. Members were divided in their opinions as to the name of the variety. Mr. Tree, a visitor, tabled samples of James' Long Keeping and Brown Globe onions, besides a cross between two named varieties. Four onions weighed 3½lbs., and all were very firm and good samples. Mr. Menzies tabled peaches identified as Lemon Cling. Mr. Pomeroy showed bunches of Grand Centennial grape, berries very large, and Sultanas, the latter weighing over 2lbs. Mr. Thornett showed Rattling Jack wheat, sown in September, and yielding equal to 18bush. per acre.

HEADING AND HARROWING WHEAT.—Mr. Thayne said, in reference to discussion on the merits of the binder and stripper, that it would not pay to use the header on a light crop unless the grain was required for seed. Mr. Thornett

agreed, and did not consider a crop averaging less than 10bush. would pay to harvest in this way. Mr. Menzies said he was incorrectly reported on page 537 of January *Journal* in regard to practice of harrowing the growing wheat crop. He was not opposed to this practice if done at the right time. He had seen wheat harrowed when it was too high.

Meningie, February 11.

Present—Messrs. M. Linn (Chairman), Thos. Joy, C. J. Shipway, A. J. Myren, R. M. Scott, W. Tiller, W. J. Botten, Jabez Williams, H. B. Hackett (Hon. Sec.), and five visitors.

FARM MANAGEMENT.—Mr. Joy read a paper on "How a Farm should be Managed," to the following effect:—

First it is important that the home should be made comfortable, so as to be attractive. The next most important part is in keeping your fences in good repair, for bad fences not only make rogues of stock, but cause trouble between neighbors. As good stabling as possible should be provided for horses, with a good yard attached, and kept for horses only. It is unwise to yard cattle and horses together. It will be found a great advantage to have gates in all cases instead of rails, which should be a little higher than the fences, to prevent stock from getting out should they break away. On a farm of 600 acres at least four draught horses, two light harness, and two hacks should be kept, and where there is a family a side saddle is useful. At least twenty cows should be kept, also a separator. Heifer calves should be reared, so as to have a beast to kill when wanted. When a cow reaches the age of ten years it should be fattened and sold. I should advise about 100 sheep be kept, Merinos for preference, as they are less troublesome to the fences. Keep a good ram, and breed enough lambs yearly to replace losses and ration sheep. A few sheep like this will not hurt to graze with the large stock. All skins should be well stretched out in the barn to dry. There should be from five to ten breeding sows kept. A crossbred sow is most profitable, as it has a greater number of pigs at a litter. It should be borne in mind that it is necessary in all cases to keep a first-class hog, for the quality of the offspring depends to a very large extent on the sire and good feeding. Pigs should be fed regularly at 6:30 p.m., 12 p.m., and 5 a.m. This is very important, and, unless looked after, next to no profit will result. I would advise the running at large of sows at farrowing time, as a better percentage will be the result. From 150 to 200 fowls should be kept. A shed with only three sides should be erected for them to roost in. It should be cleaned out at least once a week, and the manure should be placed in a pit and kept for garden purposes. The next important item is a garden. Every farm should produce its own vegetables. A good garden greatly reduces household expenses. With regard to cropping, I would advise that an assortment be sown, as every season will be suitable for one or more. Two or three classes of oats, barley, wheat, and peas will be found profitable. In preparing the land for the seed, it should be well ploughed, harrowed, and rolled. When ploughing is finished all ploughs, &c., should be carefully overhauled, repaired, painted, and all nuts slackened, oiled, and again tightened and placed in a shed, so that they are always ready for use for the next season. The same care should be taken with the harvesting machinery. Plenty of hay should be kept on hand, also fowl and pig feed. The chaff and straw should be carefully kept, so as to have a stand by in case of a drought. It is also necessary to have two or three dams or wells on the place, so as to have plenty of water both for stock and domestic purposes.

The Hon. Secretary agreed with Mr. Joy. It was, however, one thing to advise and another to act up to the advice. Still there were many farmers who could, with a little foresight and trouble, make their farms more comfortable and attractive. He considered the healthiest and best occupation for a man was mixed farming. The Chairman regretted Mr. Joy had not gone into the question of tilling the land more; he considered very many failures of crops were due to bad cultivation. Mr. Tiller disagreed with the practice of running sheep and cattle together; his experience was that they did not do well as a rule. He favored the Hornsby plough for grass lands such as they had to deal with in this district. Mr. Williams said he found Ransome and Simms ploughs the best for his work. He favored sheep on the farm, and did not think they would interfere with the keeping of large stock. His sheep saved a considerable butcher's bill, and the wool and surplus fats made a

welcome addition to his income. Mr. Botten thought it a mistake to run sheep and cattle together; they did not seem to thrive so well as if kept separate. Mr. Joy, in reply to question, said he would not advise cropping more than 200 acres a year on a 600-acre farm. Till once in three years, and do not sow same kind of grain twice in succession on the same land.

Willunga, February 11.

Present—Messrs. Thomas Atkinson (in chair), J. A. Jacobs, A. Slade, Thos. Pengilly, Joseph Valentine, and C. Bray (Hon. Sec.).

STANDARD BUSHEL.—Considerable discussion took place on the standard weight of the bushel of wheat. Members reported that the farmers generally were not quite satisfied with the standard fixed by the Chamber of Commerce, and feel very strongly about the “bags in” question, which they considered favored the merchant at their expense. The following resolution was carried:—“That, in the opinion of this Branch, the standard should be 60lbs.”

Stansbury, February 4.

Present—Messrs. Alex. Anderson (Chairman), J. Henderson, P. Anderson, C. Faulkner, P. Cornish, and George Sherriff (Hon. Sec.).

BEST KIND OF WHEAT FOR DISTRICT.—A discussion took place on this subject. Most of the members favored Dart's Imperial as a good milling wheat and a good yielder. Mr. James Sherriff had best results from African Baart, averaging about 20bush. against 13bush. from other varieties which at one time promised heavier yields. It was a trouble to clean unless reaped with a damp-weather stripper, but the extra yield more than repaid for the extra trouble in reaping and cleaning. All members agreed that frequent change of seed from other parts was very beneficial.

Onetree Hill, January 27.

Present—Messrs. J. Bowman (Chairman), A. Adams, F. Bowman, H. H. Blackham, G. Bowman, F. L. Ifould, E. A. Kelly, and J. Clucas (Hon. Sec.).

PROS.—The Chairman read a paper on this subject to the following effect:—

Every farmer should keep a few pigs; no animal gave a better return for the food consumed, provided it was of the right kind. He considered the Berkshire the best all-round pig for the farmer; it was unequalled for bacon, producing a well balanced carcass of streaky meat, for which there was a decided preference. They are easily kept and grow rapidly, are excellent mothers, and reliable breeders. The Essex pig has many good qualities to recommend it. It is quiet, easily kept, can be fattened at any age, makes a splendid porker, but is too fat for bacon. Crossed with the Berkshire a splendid general purpose pig results, preferred by many to the pure breeds. The Poland-China crossed with the Berkshire produces a good pig, one which grows remarkably fast, and gives a good carcass for trade purposes. Personally he did not care for it, the flesh being somewhat coarse and oily. In breeding never use anything but a purebred boar. Boars should be at least eight months old and sows twelve before they are used for breeding purposes. Breeding from too young stock results in deterioration in size and vigor. Sows in farrow should be allowed plenty of exercise; a grass run is best, as they will find nearly all the food they need. They should always be kept in fair condition. Two litters in the year, say March and September, are sufficient. Never have the sows farrowing in winter. Young pigs should learn to feed at three weeks, and be weaned at eight to ten weeks. Skim milk mixed with pollard makes one of the best of foods for growing pigs. After weaning never allow the pigs to get excessively fat, as it will check their growth afterwards. They must also never be allowed to become poor in condition. Feeding heavy corn to young pigs is harmful. With plenty of milk available, the expense of keeping pigs is very little; but where all the food has to be purchased there is very little profit in pigs. Pigs bred in the spring are the most profitable; they do remarkably well on good pasture for a few

months, and at five to six months should be penned up to fatten. With their digestive organs in good order they will put on flesh very rapidly. The fattening process should take about six weeks to get rid of the objectionable flavor from grass-feeding. A well bred pig at six months should with proper treatment scale 150lbs. to 180lbs. Never allow a pig that is being fattened to have food likely to spoil the flavor or quality of the meat. House slops containing too much grease and green vegetables should not be given for some weeks prior to killing. Milk and pollard is one of the best and cheapest foods to start with, and as killing-time approaches reduce the quantity and give corn or peas to firm the flesh. Peas are greatly relished by pigs, but if fed too liberally the flesh becomes hard and knotty. Pigs kept in confinement should have a supply of charcoal and wood ashes two or three times a week to keep their digestive organs in good order; it is surprising what a quantity they will consume.

An interesting discussion followed, the paper being much appreciated by members, who referred to the success achieved by Mr. Bowman with pigs.

Orroroo, February 11.

Present—Messrs. J. Moody (Chairman), S. Roberts, W. S. Lillecrapp, R. Coulter, jun., M. Oppermann, J. Jamieson, and T. H. P. Tapscott (Hon. Sec.).

BLUESTONE FOR PICKLING.—A discussion took place on the purity of the bluestone used for pickling wheat as a preventive of bunt. It was stated that in former years sulphate of iron was mixed with the bluestone with the result that the crops were badly infested with bunt.

TOMATOES.—Mr. Coulter wished to know cause of tomatoes failing to ripen. The fruits grew to full size but did not color. None of the members could suggest cause or remedy.

HARROWING WHEAT.—The Hon. Secretary tabled samples of wheat grown on similar land, portion of which was harrowed during growth in August. Members were unanimous that the grain from the harrowed crop was much superior to that from the rest of the field, while the Hon. Secretary said the return from the harrowed portion more than doubled that from the other.

Forest Range, January 26.

Present—Messrs. J. Vicars (Chairman), J. Caldwell, R. E. Townsend, W. Cherryman, H. Caldicott, C. Stafford, and R. M. Hackett.

HON. SEC.—Mr. J. Caldwell was appointed Hon. Secretary, *vice* Mr. R. M. Hackett, resigned.

ONION PEST.—Mr. Caldwell called attention to damage of onion crops by some insect. Members were of opinion that thrip was the cause of the damage.

SUMMER PRUNING.—A discussion on this subject took place.

Calca, February 11.

Present—Messrs. A. B. Smith (Chairman), Jas. Bowman, W. Wilcott, and D. P. Thomas (Hon. Sec.).

WHEAT TESTING.—Samples of wheat for testing were tabled by various members. Rattling Jack went 65lbs. to the bushel, Nonpareil 61lbs., Dart's Imperial 64½lbs., Purple Straw 61lbs.

THOMAS PHOSPHATE FOR WHEAT.—Mr. Wilcott said he had received a communication from the Central Bureau in regard to reported injurious effect of Thomas phosphate on his wheat crop. His report was quite correct. The phosphate was distributed by means of a broadcast seed-sower over alternate lands at the rate of 1cwt. per acre. The manured portion looked best until the dry weather set in, when it became white and withered. This was probably

due to the dry weather and the intense heat. To give the manure a fair trial he intended sowing this land again this year to see whether any benefit will show.

WEANING OF FOALS.—A discussion took place on the best method of weaning foals. Mr. Smith said he found it best to remove the foal and milk the mare for a few days, washing the udder with vinegar to dry up the milk. Mr. Wilcott said he often used muzzles successfully, but the other members considered this dangerous to the mare. A member stated that bathing the teats with bitter aloes prevented the foal from sucking.

USEFUL GRASS.—Mr. Thomas tabled grass forwarded by a resident who found it growing upon drift sand and upon good soil. It was very early and hardy, and greatly appreciated by stock, which would leave good stubble to feed upon it. Other members spoke well of this grass. To be sent to the Central Bureau for identification. [This proves to be *Lepturus cylindricus*, apparently a valuable grass, and should be protected against being eaten out by stock.—GEN. SEC.]

Colton, February 4.

Present—Messrs. P. P. Kenny (Chairman), E. Whitehead, John Shipard, W. McElder, A. S. Bartlett, M. S. W. Kenny, and R. Hull (Hon. Sec.).

EXPERIMENTAL WHEAT PLOTS.—Mr. A. A. Stephens furnished following report on experiments at Colton public school:—

Owing to the small rainfall, 11 ins., the crops this year on the West Coast have been generally poor, averaging about 4bush. per acre. In the school plots seventeen varieties of wheat obtained from the local farmers were tried without the aid of artificial manures. The following results were obtained:—Crowe's Record, equal to 17bush. per acre; African Baart, 16½bush.; Dart's Imperial, 15bush.; King's Early, 14½bush.; Allora, 14½bush.; Dinnison's Purple Straw, Bartlett's, White Tuscan, Velvet Purple Head, Red Straw, Higgins, Crowe's Wonder, and Hull's Purple Straw, each 13½bush.; Marshall's No. 3, 12bush.; Club Head, 11bush.; Steinwedel, 9bush. Most of the varieties have been grown here for a number of years. He found the bearded varieties yielded best in this dry climate, and suggested sowing African Baart or King's Early, mixed with Steinwedel, as he thought the bearded varieties would prevent the other from shaking out as it does when sown by itself. Experiments were also tried with different quantities of seed per acre. Forty-five pounds, 90lbs., and 135lbs. were sown, with returns of 14½bush., 11½bush., and 9bush. respectively. Another experiment was sowing at different depths, 45lbs. per acre being sown. The returns were:—Sown 1in. deep, yield 9bush.; 3in. deep, yield 11½bush.; 5in. deep, yield 3bush. A plot of carefully selected grain, another of medium, and another of small shrivelled grain were sown side by side, the plump grain giving the best results, while the shrivelled grain was almost a failure. A few plots of oats and barley were sown, but these were not a success, the soil being too porous and not stiff enough to hold the roots firmly. Waldergrave guano was used on a few plots of wheat without any noticeable result. This may be due to the dryness of the season, or to the soil being unsuitable for the guano, as it has given good results in other parts of the district with a better rainfall.

Members were unanimous in the opinion that wheat for seed required special cleaning, and that it paid better to do this and feed the small stuff to the farm stock than to sow seed as usually cleaned. While some had had good results from shrivelled seed they did not advise using it when good sound seed was obtainable. Mr. Stephens tendered his resignation as member, having been transferred to the Sellick's Hill school. Members regretted the loss of one of their most active members, and referred in complimentary terms to the value of the work done by Mr. Stephens at the Colton school. Members were unanimous in their opinions of the value of properly-conducted agronomical plots in connection with the public schools, not only to the younger members of the community, but to all interested in agronomical pursuits. Mr. Whitehead reported on his experiments with wheat at Mount Wedge. Eight ounces of each variety were sown on plots 6yds. square, with the following results:—King's Early produced 4lbs. grain and 18lbs. straw; would have yielded much

better but for damage done by crows, this being the first to ripen. The straw was apparently very sweet, being eaten up by the horses about as clean as good hay. Dart's Imperial wheat returned 6lbs grain and 21lbs straw; Dinnison's Purple Straw, 5lbs. wheat, 18lbs. straw; Hull's Purple Straw, 7lbs. wheat, 23lbs. straw. The two latter wheats are varieties of Purple Straw, and very much alike, the difference during growth being very hard to distinguish.

Strathalbyn, February 13.

Present—Messrs. B. Smith (Chairman), G. Sissons, R. Watt, W. J. Tucker, D. Gooch, W. M. Rankine, P. Cockburn, J. Cheriton (Hon. Sec.), and one visitor.

CONFERENCE.—Arrangements in connection with the Annual Conference of Southern Branches, to be held at Strathalbyn on March 24, were considered.

MANURING.—Considerable discussion took place on the use of commercial fertilisers. Members generally approved of the opinion expressed by Mr. E. R. Morgan in his paper on this subject.

SHEEP.—Mr. D. Gooch read a paper on "Merino Sheep *versus* Other Breeds."

The Merino sheep, after about 100 years' trial in Australia, have proved by far the most profitable stock that can be kept. Perhaps on small holdings the cross with the Merino ewe and one of the early maturing breeds (Shropshire for choice) may be more profitable, as the lambs are better and the wethers fit for market quite one year before the pure Merino. But on large holdings the pure Merino is far and away the most profitable. On very rich pasture, like the volcanic country round Mount Gambier and many parts of the Western districts of Victoria, it is found that the Lincoln does best. The Merino requires great attention in the matter of culling out all indifferent wool sheep from the breeding ewes. A pound of Merino wool is generally worth 6d. to the grower, and it requires no more grass to keep a ewe that will cut 10lbs. of wool than one that will cut 5lbs. A flock of Merinos can, by judicious management, be kept up to 8lbs. per fleece for ewes, and 3lbs. to 4lbs. for lambs, and it is quite possible to very much improve these weights. Most of the Burnside dry sheep cut 11lbs. this season, and the breeding ewes all cut over 9lbs., the rams of this flock cutting from 14lbs. to 25lbs. The original Merino introduced into New South Wales by Mr. McArthur were Spanish Merino of a very fine type, but a great many different types have since been introduced into the colonies, amongst the most remarkable of these being the German Merino and the Vermont, the latter being a very dense and heavy wool, cutting on full fleece rams up to 40lbs. of good wool, and many Vermont ewes have been shown of late years that have cut 22lbs. In South Australia there are many kinds of the Merino, but the old very fine silky wool is fast going out of date, and it is now generally found that a robust type with a good even tip and a fair amount of grease is the most profitable class, as this style of wool is generally found on good framed sheep with a strong constitution and better does than the old fine class. Merino lambs do not grow quickly enough for the market, and the butchers prefer the Shropshire or South Down cross, but for the quality of the meat there are no lambs equal to the Merino, the fat and lean being more evenly distributed than in the coarser sorts, and the meat of an old Merino sheep is very much nicer than any other breed. There is another marked advantage the Merino sheep have over any other breed, they do not get over or through fences, and being more attached to the place where they were bred will very seldom go away even if the fences are bad. A good class of Merino will cut 2s. worth of wool each year more than any other breed, unless it be the first cross between good Merino ewes and Lincoln rams, but you can only take the first cross; if you go beyond that you get a mongrel wool with no character and very little weight. Some years Lincolns and cross-bred wools have brought a higher price per pound, but taking an average of the last twenty years, Merino has beaten all other wools in price and in weight. Another advantage the Merino has over any other breed is they live longer, and if they are kept until they are old—although very foolish to do if it can be avoided—will get fat at an age when crossbreds and Lincolns would be past fattening. Merino ewes will bring up lambs at an advanced age. All sheep are liable to such parasites as tick, lice, and scab, but the Merino sheep are less apt to catch these than the open-wooled sheep. The Australian colonies have never been so flourishing as when the wool industry has been paying well, and the Merino sheep are always the main factor of that industry. The loss to South Australia through the greater part of the North and North-West country being unoccupied is enormous, and these lands are well adapted for the breeding of pure Merino sheep. I have had practical experience with sheep without any intermission for over forty years, and I say that in all my experience the Merino sheep is the best for most parts of Australia. I have always found that it is much better to keep the different sorts and ages separate, where possible. The ewes should not be put to

the rams until after they are two years old, being first of all culled in their full fleece, the culls being sold or used as killing sheep, but of course the best plan is to sell them. A farmer could not have a better sheep for killing, that is if he is killing his own meat, than an old Merino ewe. She will weigh better and give more useful meat than any other sheep, and a Merino ewe, if on good feed in July, August, and September, will get fat even if she has no teeth. I have always found that the best time to lamb from Merinos is April and May; if left later it is too cold, and the lamb does not grow until September, thus having no time to get strong before the summer sets in.

Carrieton, February 16.

Present—Messrs. W. G. Gleeson (Chairman), A. Steinke, W. Steinke, J. McNamara, H. Menz, G. Martin, F. Vater, F. Kaerger, J. F. Fisher, and J. W. Bock (Hon. Sec.).

BLUESTONE FOR PICKLING.—Members did not agree with the General Secretary's statement that bluestone made in South Australia was equal to the imported article in quality. Their experience was that the English manufacture was much superior, containing a higher percentage of copper, as proved by dipping steel or iron into water in which the bluestone had been dissolved.

SEED DRILL.—It was decided to endeavor to arrange for a public trial of a seed drill at Carrieton at an early date.

HORSES FOR FARM WORK.—Mr. Kaerger read a short paper on "The Most Suitable Horse for the North." For a good all round farm horse he preferred stock from a blood mare by a draught stallion, as they were more active, with plenty of life and pluck, can do just as much work as heavier horses, and are at the same time useful for saddle or harness work. He liked to see a team of well-bred draught horses, but from his experience he did not consider them so profitable as the other. For saddle purposes only he preferred a horse as nearly pure bred as possible. He believed most of the farmers in the North had found the cross between the blood and the draught horse had stood the hardships of the past seasons better than pure bred draught horses. A few weeks ago he noticed a paragraph condemning as cruel the practice of docking. With this he did not agree. He made it a practice to dock all his foals as soon as he could see what shape they were likely to grow to. Foals likely to make tall horses he only docked a trifle, but with a round thick-set horse more was docked. The operation greatly improved the appearance of the horse.

POISON FOR RABBITS.—The Chairman called attention to statement of a member of Kanmantoo Branch that the addition of a little oil of aniseed to phosphorised pollard made it more palatable to the rabbits, and consequently more effective.

Mylor, February 11.

Present—Messrs. W. Nicholls (Chairman), W. H. Hughes, F. Rosser, E. Wilson, F. G. Wilson, P. P. Proberts, H. Phipps, R. S. Mundy, T. Mundy, E. J. Oinn, W. G. Clough (Hon. Sec.), and five visitors.

CODLIN MOTH.—Mr. George Monks read a paper on this subject to the following effect:—

He considered it astonishing the amount of ignorance displayed by many growers concerning this pest, and many absurd statements were made in consequence. Some growers say the codlin moth caterpillar is to be found in fences, stringybark trees, tomatoes, potatoes, dried fruits, &c. He would not say that this caterpillar was never found in fences, trees, bags, &c., but he was emphatic that they were there only by accident of circumstances. The caterpillar will go to the nearest shelter it can get after leaving the fruit, and if close to a fence or stringybark tree will naturally hide there; or if empty cases or bags are lying about near infested trees they will provide the shelter the caterpillar requires. He absolutely denied that the codlin moth caterpillar was found eating tomatoes, potatoes, dried fruits, &c. The natural food of this caterpillar is the fruit of the apple, pear, and quince, and other fruits of the same order, the two first being the principal sufferers. After describing the life history and habits of the codlin moth caterpillar, and the difficulties such natural enemies as ants, wasps, beetles,

etc., have in coping with it owing to its habits, Mr. Monks referred to the action necessary for the growers to take to combat the pest. The first thing to do was to remove all natural shelters for the caterpillar by cleaning off all the rough bark from the trees, removing all rubbish, timber, &c., and then put suitable bandages on the trees in which the caterpillars will hide. These bandages must be examined regularly, and all caterpillars found therein destroyed. Besides this, all infested fruit should be gathered up, empty cases and bags carefully dipped in boiling water or fumigated with sulphur fumes. Many people claim that spraying the trees with arsenical mixtures at the proper time was very beneficial, especially in destroying the first broods, but as a grower he was satisfied there was no absolute necessity to spray their trees. If the other measures were properly carried out they were quite sufficient to at least reduce the pest to such an extent that it will do no very serious harm, provided always that the growers generally do this work. It is useless one doing it and allowing others to let things take their course. Everyone must carry out this necessary work. It has been contended by many that the growers have already done all they can to cope with the pest, and that it cannot be kept down. Having travelled through most of the orchards in the Hills he claimed to be in a position to know what he was talking about, and emphatically denied that such was the case. He would go further and challenge anyone to show twenty growers in the Hills of whom it was correct to say they had done what they could in the matter. Very few growers take any precautions at all with empty cases; some do not put on the bandages until too late, others do not examine the bandages as carefully and regularly as they should, whilst others do nothing at all until they are forced to. It is absurd also for people to say that the codlin moth caterpillar does not spoil the fruit for eating. In the first case infested fruit would not carry safely to England, and if it did buyers would not look at the fruit. People here as well as in England prefer clean fruit at all times.

In the discussion which followed, Mr. Hill stated that he brought the codlin moth to his place in a bag of potatoes purchased in Adelaide. [This is very likely to happen as long as unscrupulous growers bring in codlin moth-infested apples to the market. The caterpillars find splendid shelter in the bags of potatoes, &c., lying about near the fruit cases. The statements that codlin moth caterpillars have been found in potatoes and tomatoes is, however, absolutely incorrect, no well-authenticated cases of such attack being known, though we have frequently hatched out so-called codlin moth caterpillars found in such fruits, and proved them to be something very different.—GEN. SEC.]

DAIRYING.—It was decided that the Minister of Agriculture be asked to loan to the Branch one of the Jersey bulls owned by the department. A committee was appointed to make arrangements for forming a cow club in the district, with the idea of obtaining cows of good milking qualities.

Maitland, February 4.

Present—Messrs. H. Pitcher (Chairman), H. Bawden, Thomas Bowman, John Hill, J. M. Smith, and J. S. McLeod.

HON. SECRETARY.—Mr. C. W. Wood tendered his resignation as Hon. Secretary, and Mr. J. S. McLeod was appointed in his place, a vote of thanks being accorded to Mr. Wood for his past services, regret being expressed at the necessity for his resignation.

AYRSHIRE BULL.—A committee was appointed to take charge of the Ayrshire bull loaned to the Branch by the Department of Agriculture.

Balaklava, February 11.

Present—Messrs. W. H. Sirs (Chairman), C. L. Reuter, J. Mills, J. Crawford, E. Roberts, E. Hains, G. Reid, W. Smith, A. Manley, and E. M. Sage (Hon. Sec.).

MANURING.—Considerable discussion took place on use of manures and the seed and fertiliser drill. The Hon. Secretary reported that two paddocks adjoining his were newly ploughed and sown on June 1. One was drilled in

with 1cwt. English super. per acre, and returned 13bush. per acre; the other was sown broadcast without manure, and returned 3bush. only. All other conditions were as nearly equal as possible. He had applied English super. at about 1cwt. per acre in different ways. One part was ploughed in with the seed; another was harrowed in with the seed, some scarified in, and some sown on the surface after the crop was up and not touched in any way. The manure sown on the surface gave apparently the best returns, though all the manured land was very much better than the unmanured. Mr. Hains stated that in 1897 he applied 30lbs. per acre of Leeds brand phosphorene, costing £14 per ton, and 1cwt. of colonial super., English super., Thomas phosphate, and guano to different parts of a paddock. Phosphorene gave the best results, and he considered 20lbs. of this high-grade manure would have been sufficient; the supers. came next; the Thomas phosphate gave very fair results, better in grain than straw; but the guano showed no benefit. Contrary to expectation, Thomas phosphate gave him a good return on rubbishy limestone land. In 1898 he sowed the same land without manure, to see what after effect the manure would have. Unmanured land returned only about seed, but where the supers. were applied he got nearly 5bush. per acre. There was a slight benefit apparent from the guano. Members generally agreed that, when the farmer did not trouble about the future, English super. was most profitable, but for a general manure colonial bone super. was the best. A member stated that he could not get the agent for dealers in manures to give any analysis of the manures when taking orders for same, the consequence being that the merchant could send any quality once he got the order and the money. If this was allowed it seemed to him that the Fertilisers Act would not be of much benefit to the farmer. He wished to know whether the merchant was supposed to supply an analysis of manures sold by him on application.

MANURE EXPERIMENTS.—Mr. C. N. Grenfell, of Mount Templeton Public School, forwarded the following report on experiments with different manures. Purple Straw wheat was used in all experiments, an equal number of grains being sown in each drill.

Sown before Rain.

Kind of Manure used.	Quantity of Manure used per Acre.	Sown.	Ripe.	Height of Crop.	Comparative Average Yield per Acre.	Remarks.
	lbs.	1898.	1898.	in.	bush. lbs.	
Bonedust	*100	April 30	Nov. 18	27—36	20 0	Very fair sample.
(Broken Hill)	150	"	"	27—36	12 40	
	200	"	"	27—36	7 17	
	100	"	"	30—37	12 16	
Eng. superphosphate	150	"	"	30—37	7 54	Fair grain, but smutty.
	200	"	"	30—47	10 8	Fair sample.
Eng. superphosphate, wood ashes (mallee), equal parts	100	"	"	20—36	7 6	Smut.
	150	"	"	26—36	13 7	
	200	"	"	24—30	8 23	
	100	"	"	24—30	4 55	
Thomas phosphate	150	"	"	24—30	6 15	
	200	"	"	24—31	8 1	
	100	"	"	22—24	6 11	
K.I. guano	150	"	"	22—24	7 21	
	200	"	"	22—26	8 1	

* This drill being adjacent to deeply fallow land, it is probable that the plants in it derived some benefit from it.

Sown after Rain.

Kind of Manure used.	Quantity of Manure used per Acre.	Sown.	Ripe.	Height of Crop.	Comparative Average Yield per Acre.	Remarks.
	lbs.	1898.	1898.	in.	bush. lbs.	
Eng. superphosphate	100	May 27	Nov. 26	17—32	10 5	Smutty crop. Smutty crop. Clean sample.
	150	"	"	22—33	13 14	
	200	"	"	22—36	17 30	
Super-guano	*100	June 11	Dec. 1	20—24	9 43	
	*150	"	"	22—25	15 8	
	*200	"	"	22—27	13 20	
Bonedust (Broken Hill)	100	May 27	Nov. 26	16—30	8 38	
	150	"	"	16 29	9 6	
	200	"	"	15—26	9 3	
K.I. guano	100	"	"	16—30	10 45	
	150	"	"	15—28	8 48	
	200	"	"	14—26	9 15	
Thomas phosphate	100	"	"	20—28	7 35	
	150	"	"	16—28	8 26	
	200	"	"	17—30	9 3	
No manure	—	May 28	"	18—26	7 28	
Peru guano	100	"	"	20—31	13 58	Good crop. Light crop.
Kainit	100	"	"	16—26	5 13	
Eng. superphosphate, wood ashes (mallee)	200	"	"	21—33	10 45	
Thomas phosphate, Star brand	200	"	"	21—27	9 47	
Lime	400	June 3	Dec. 5	14—25	9 15	
Ashes	400	"	Dec. 3	14—25	8 12	
Charcoal, finely powdered	400	"	Dec. 7	16—28	7 17	
Grains of wheat coated with Eng. superphosphate	7½ lbs. to 1 bush. seed	"	Dec. 7 to 12	17—30	7 25	{ No smut; germinated very irregularly.
Thomas phosphate (Hackett's)	200	May 28	Nov. 26	21—27	7 50	

* These drills were sown a little later, during very wet weather. The manure had a rank smell at time of sowing.

CATTLE DISEASE.—Mr. Reuter reported successful cure of cattle attacked by apoplexy by the following treatment:—Give a bottle of raw linseed oil, repeat dose two hours later, and afterwards give a tablespoonful of Osmond's cattle oil three times a day with injection of warm soapy water three or four times daily. Feed animals on gruel only.

Koolunga, January 26.

Present—Messrs. T. B. Butcher (Chairman), J. Jones, R. H. Buchanan, R. Lowry, J. Button, W. J. Jose, R. Palmer, J. Freeman, W. T. Cooper, J. Butterfield, G. Pennyfield (Hon. Sec.), G. Steel (Redhill Branch), and five visitors.

DAIRY CATTLE.—Considerable discussion took place on this subject, the members being of opinion that although the smaller breeds, like the Jersey, were good producers of butter, the larger kinds would be more profitable to

the average farmer, as there would be more milk for sale, calves could be fattened and steers sold, and they could produce more cheese. The Shorthorn and Ayrshire breeds were most favored.

NOXIOUS WEEDS.—Mr. Jones initiated a discussion on noxious weeds. The country east of Koolunga was infested with noxious weeds which, if not destroyed, would be carried over the farms with floodwaters. The present Noxious Weeds Act could be easily evaded, and the District Councils defied. The Act urgently needed amendment, so that its provisions could be enforced. It was decided to ask the other Branches to consider the question, with a view to getting the opinions of those interested in the better working of the Act.

Tatiara, February 4.

Present—Messrs. Thos. Stanton (Chairman), E. Prescott, C. H. W. Wiese, R. Scown, H. Killmier, F. Smith, and W. E. Fisher (Hon. Sec.).

DISTRESSED FARMERS.—The Chairman reported that the public meetings at Bordertown and Mundalla, called to consider the question of obtaining seed-wheat for the drought-distressed northern farmers, had fallen through owing to non-attendance of the residents. Regret was expressed that no practical result had been the outcome of the action taken by the Branch.

CHANGE OF SEED.—Considerable discussion took place on change of seed-wheat, all members agreeing that a change was decidedly beneficial. Mr. Wiese stated that he obtained a bag of seed of Purple Straw wheat from Yorke's Peninsula last year, and reaped from the crop thirty-eight bags of good seed. Mr. Prescott favored a change under all circumstances. It was decided to obtain from the Roseworthy College twenty-five bags of King's Early wheat.

Pyap, February 17.

Present—Messrs. W. Axon (Chairman), A. J. Brocklehurst, C. Billett, T. Smith, J. Holt, J. Bowes, B. T. H. Cox, H. Mills, C. Coulls, W. C. Rodgers (Hon. Sec.), and one visitor.

CHAIRMAN.—Mr. J. Holt was elected Chairman for the year.

PRUNING.—Considerable discussion took place on the summer pruning of fruit trees, as dealt with by the Inspector of Fruit in the *Journal of Agriculture and Industry*. Several members stated they had followed out the advice of Mr. Quinn.

Cradock, February 18.

Present—Messrs. R. Ruddock (Chairman), P. Gillick, J. Ramsay, J. Turner, J. Paterson, R. Solly, A. E. Clarke, B. Garnett, J. H. Lindo (Hon. Sec.), and three visitors.

HARVEST RETURNS.—Members reported on harvest returns for last season. Hundred Cudlamudla, 2½bush. wheat, 12cwt. hay; Wirreanda, wheat 1bush., hay, 10cwt.; Uroonda, wheat, 40lbs.; Eurilpa, wheat, 50lbs., hay, 5cwt.; Yednalue, wheat, 1½bush. The poor returns are a result of the drought.

DEPTH TO SOW WHEAT.—Discussion on paper read by Mr. Garnett at previous meeting was continued. Mr. O'Dea considered the paper very practical. Rough ploughing made more plant food available from the soil, and the wheat would be stronger if it had sufficient moisture to keep it growing the first time it sprouted. Each time it sprouted it became more difficult for it to strike root. Mr. Paterson thought it impracticable to cover only ½in. deep when the seed is

broadcasted; he favored 3in. Mr. Clarke said he sacrificed a portion of his fallow in the summer to destroy the weeds. On this the seed was sown and scarified in. The other portion of his fallow was only harrowed in, and this returned 12bush per acre against only 6bush. from the other. The soil was loose clay, and he was of opinion that scarifying in the seed buried it too deeply. He considered 2in. deep enough. Mr. Gillick favored covering seed to a depth of 3in., but did not see how they could maintain any regular depth with broadcast sowing. Mr. Solly considered $\frac{3}{4}$ in. to $\frac{1}{2}$ in. deep enough. Uniform depth could only be obtained by use of seed drills. Mr. Garnett, in reply, maintained that the depth of sowing could be regulated by widening or closing the mould-board of the plough. Wheat 3in. or 4in. in depth would have a difficulty in pushing through the ground. By a large majority the meeting decided that wheat stood more at 2in. or 3in. than if sown only $\frac{3}{4}$ in. deep.

Gladstone, February 4.

Present—Messrs. J. King (Chairman), J. Tonkin, C. A. Gallasch, J. H. Rundle, J. Shephard, B. Griffiths, J. Brayley, E. Coe, W. A. Wornum, J. H. Sargent, J. Milne (Hon. Sec.), and three visitors.

MANURES AND SEED DRILLS.—Considerable discussion took place upon this subject. Mr. Brayley reported following results from some thirty-acre plots:—Unmanured, 7bush. per acre; super, costing 5s. 6d., 17bush., increase value £1 5s.; Thomas phosphate, 15bush., increase valued at £1; guano, cost 3s., yield 12bush., increase valued at 12s. 6d. Mr. Tonkin said the manure he used showed little benefit. Mr. Gallasch said he reaped the best crop he had ever had, averaging 18bush. Mr. Rundle cut the best of his wheat for hay, the rest averaged 11bush. Mr. King had used a number of manures but found super far the best. He averaged 1 ton of hay and between 15bush. and 16bush. wheat off about 700 acres. He considered the manured crops 40 to 50 per cent. better than the unmanured.

Bowhill, January 28.

Present—Messrs. W. Towill (Chairman), A. Dohnt, C. Dragomuller, J. MacGlashan, J. Waters, W. G. F. Plummer, H. H. Plummer (Hon. Sec.), and two visitors.

CEREAL EXPERIMENTS.—Mr. W. G. F. Plummer reported on his experiments as follows:—Of twenty varieties of wheat Majestic was the best, and he could recommend as a good yielding wheat, and as rust-resistant. Steinlee, an early variety resembling Steinwedel, except that it does not shed so easily, came next. Marshall's No. 33 was a good yielder, stands up well, does not shed, and is suitable for this locality. Ranjit, Indian King, and Marshall's Early were good varieties and early, but he would not advise too much of these being sown, as they are liable to go down. Marshall's Prolific and White Monarch do not seem suitable for dry seasons. It is impossible to form a correct idea of the relative value of the various wheats when they are all sown at the same time, as these were, as some varieties require to be sown very early. The first five varieties are suitable for sowing in this district in June, whereas some of the varieties he tested should be put in not later than April. Mr. Towill said he received from the Branch three years ago 100 grains of Gravestock's Frampton wheat; he had sown each season the produce from this and last year reaped 13bush. This variety differed from Steinwedel, in that it did not shake out, and the chaff is much whiter. Mr. Dohnt sowed

200 grains of Petatz Surprise wheat last season and reaped 8lbs. of grain. He considered Marshall's Crossbred worthy of a trial in the district, as it seemed a suitable variety. Mr. Towill strongly favored Dart's Imperial; it turned out better than any other variety he had grown.

WHEATBAG.—Mr. Towill initiated a discussion on the size of the wheatsack. He strongly advocated the 2bush. sack as being more durable, easier to handle, and not so likely to cripple the people who had to handle them as the present sacks, which often held nearly 300lbs. The majority of members favored the smaller bag.

AGRICULTURAL SHOWS.—Mr. W. G. F. Plummer read a paper on this subject. The following is a condensation:—

Professor Lowrie has done much good by bringing this matter into prominence. He has taken a bold stand in advocating a system entirely new to most South Australians. His ideas are, I believe, taken from societies which are able to carry them out, having a larger and more closely settled population than we have. With this difference we have to find out whether the same benefit will result here from such societies. The objects of agricultural shows are to promote and encourage better breeds of stock, give an impetus for better cultivation; in short, to benefit all agronomical pursuits. If the shows are not doing this we must find out the faults and endeavor to rectify them. I think that shows as generally conducted, although doing a deal of good, are not so useful as they should be. Most people will agree that too many shows are held; on the other hand, Professor Lowrie's suggestion makes too few. To lessen the number, societies holding them in townships near each other should affiliate, each having the show in turn. No doubt such a suggestion will be strongly opposed by those societies which have reigned supreme for a long time, owing to local difference and petty selfishness. If shows continue to increase at the rapid rate they have been doing Parliament will think it time to control them, and it would probably be better to have some such controlling force. Three river Branches have adopted the plan of combining and holding annual shows in different localities. If each of the three places desired to have one every year it would be detrimental to the others. It is much easier to start on these lines than for old organisations to adopt them. With so many shows in existence prizes have become so common that no value or honor is attached to them. A prize stallion seems to be in no more estimation than the general run of stallions, because prizes are often given to exhibits which are not worthy of them. We occasionally hear such as the following. "Oh, we cannot be expected to judge from an Adelaide Show standard, else the whole class will have to be thrown out;" and they award the prize to the best, whether worthy or not, and thus a lot of harm is done, as people will naturally conclude that the exhibit must be worthy. This impression leads the owner and others to breed from such stock. Each society should adopt rules for the judges and see that they are strictly adhered to. One rule should be that judges shall not recommend a prize to any exhibit that is not up to the highest standard. Each year there is an insufficiency of exhibits of horses and cattle at the Adelaide Shows, and there must be some reason for this other than that the breeds are not in the colony. Some people have the idea that they possess nothing good enough to compete against the breeders who from time to time exhibit and generally carry off the prize. In one class especially, that is cattle, some think it useless to compete. It sometimes happens that the same animal is shown year after year, and being faultless, the duty of the judges is of course to give it first prize. Cannot this be remedied by not allowing the same animal to be shown more than three times? If it takes two consecutive first prizes, the third should be a champion, and not allowed to compete again. There can only be one best. There can, however, be many worthy. To encourage importing, a very high and special prize should be offered for the best imported animal—owner to be a resident in the colony. I do not agree in giving money prizes for most things. If I exhibit an animal in Adelaide, and am successful in carrying off first prize, the honor of so doing is enough, without monetary consideration; but every one does not place the same value on this honor. Our Branch Show was a decided success with certificates of merit only. We certainly should have a national show, as Prof. Lowrie suggests, but the conditions should be such that prize-takers from other colonies should benefit this colony in some way. Otherwise we are only offering honors without reaping any benefit from them. Mr. Angus has taken prizes in Victoria and New South Wales, but unless, of course, the exhibits are purchased for use in those colonies, in what way was his action a benefit to those interested in getting up those shows? Prof. Lowrie's suggestion that with the prizes for stallions it should be condition that the winners shall serve a certain number of mares at a price in the district, should meet the difficulty. The same could also apply to other animals. When country shows give large prizes, they also should be made conditional, so the particular district reaps some benefit from the expenditure. Prizes should not, for instance, be awarded for implements, &c., of no value in the particular locality. As to machinery, money prizes as a rule have little attraction. I was informed by a representative

of one of the leading firms in Adelaide that when their machine took a prize the prominence given to it was sufficient as an advertisement to recoup them for all expenses incurred by transit. And those who do not take a prize, by bringing their articles under the people's notice sometimes make a sale, as one person may have a greater fancy for that machine than for that which took first prize. It is sometimes the case that machines which take the prize will do the best work at the time of trial, and is best in appearance, but machines that have been beaten by it would be in good order after the prize-taker has become expensive on account of repairs. For instance, I have a mower, the maker of which very rarely takes a prize at a show, and have had it for five years, not only doing our own work with it, but have let it out every season. This is the first season it has cost anything for repairs, mainly due to the rough country over which it worked. In order then to test the best machine, it would be advisable for the authorities controlling a national show to have a special piece of ground put under crop for trials of mowers, binders, &c., and for the cultivation of this land have the trials of ploughs, &c. The same machinery should be under the control of the society for three years, giving results to the public each year; the third trial to be final. The points should be made on a sliding scale, according to the relative value in importance. Often at field trials all possible points are equal, so that an important defect is balanced by something that is not so important. Professor Lowrie thinks it a waste of time, or that no benefit accrues from offering prizes to encourage a show of vegetables, flowers, fancy work, &c., at agricultural shows. Any encouragement to promote a desire to obtain a good article is always beneficial, and encouragement in the shape of a show honor tends to tempt one to produce something exceptionally good.

Richman's Creek, February 20.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, J. J. Searle, W. Rodgers, W. J. Wright, P. J. O'Donohue, J. McSkimming, J. J. Gebert, and J. McColl (Hon. Sec.).

SAVING WHEAT CHAFF.—Mr. Wright reported having seen stacks of wheat chaff of a height of 12ft. before being rounded off. They were built round in shape, and were well trodden at the sides during building. A covering of straw was put on during erection and when completed. Mr. O'Donohue said he had heard of the chaff heaps being covered with straw to thickness of 3ft. to 4ft. in such a way that on removal of the chaff the straw covering remained intact, and the heaps could be renewed under the old covering. Members thought stacking the chaff might be useful when it is desired to save it for future use, but for immediate use, where no shed accommodation is available, a long heap well covered with straw required less labor and would answer just as well.

BAG-LOADER.—Mr. Gebert gave a practical exhibition of a bag-loader made by himself, and consisting of two timber uprights about 12in. apart, connected at both ends on the under side; this stands against the frame of the wagon; at the upper end it is further extended about 3ft., and sufficiently wide apart to allow the bag of grain to drop through. A small windlass is fixed on top to draw up the bags. Mr. Gebert found he and his boy could load the wagon in less time and with less labor than two men could by lifting in the ordinary way. Several members tried the arrangement and were pleased with its work. The members thought that, with a few little alterations, the loader would prove of great benefit on a farm where there were only a few hands, and would save a lot of heavy lifting. The cost of constructing it should not exceed 10s., and one man could carry it easily.

Clare, February 13.

Present—Messrs. J. Christison (Chairman), W. S. Birks, J. Treleaven, C. J. McCarthy, and J. T. Hague (Hon. Sec.).

ZANTE CURRANTS.—Mr. Birks tabled bunches of Zante currants, some from a ringed rod, and others from a rod not ringed. The former had large berries and full bunches, the other being ordinary size berries and straggly bunches. He was so satisfied with the experiment that he intended ringed the whole of his Zante currant vines.

BIRD PESTS.—Members reported that the starlings were increasing rapidly, and that the birds generally were very destructive this season.

DISEASE OF APPLES.—The disease affecting apple trees, causing the bark to die, was discussed. The general opinion was that it was caused by the fierce rays of the sun in the afternoon on the north-west side of the trunks, scorching the bark. It was recommended to protect the trees on this side and to cut back to healthy wood. The following notes on this subject were read :—

Dr. Samuel Hape, a prominent horticulturist of Georgia, considers the afternoon sun as having a marked injurious effect upon the south-west side [north-west in this colony] of the trunks of fruit trees. The peach, when trimmed high, suffers greatly from this cause. The bark dries up, and unless timely protection is provided the exposed trees slowly die from the effects of the fiery rays of the afternoon sun. The warming influence of the morning hours is sufficient to overcome the cooling action of the night, and preserve the health of the tree. The effect of the afternoon sun is very marked in blighted pear trees, the south-west side [north-west] being usually first affected. Trees that are grown on hillsides sloping towards the east and south-east are much less subject to the mysterious and deadly blight. Currant, gooseberry, and raspberry plants are in like manner affected by exposure to the bright sun of the afternoon. Experiments in boxing trees, especially the cherry, have been very successful. It is only necessary to protect the south-west side of the tree trunk. Dr. Hape suggests two boards nailed together lengthwise by their edges, and placed on the west side, as being sufficient to protect the tree. Where possible trees may be shielded by being planted on hillsides sloping to the south-east [north-east]. Low limbs will furnish much shade to the trunks, and may be obtained by proper pruning. The small fruits—currants, gooseberries, raspberries, &c.—can be easily protected from the afternoon sun by being planted on the east side of the fence, or other objects yielding shade. This matter of the sun-killing of fruit trees demands the attention of all practical fruitgrowers.

Inkerman, February 21.

Present—Messrs. E. M. Hewett (in chair), Jas. Sampson, W. Fraser, Thos. Forrest, J. Lomman, Geo. Peter, W. A. Hewett (Hon. Sec.), and two visitors.

FEEDING WHEAT TO STOCK.—Chairman read paragraph from February issue of *Journal* re feeding wheat to pigs, poultry, &c., when so low in price. Mr. Forrest was confident that fowls, properly attended to, would return at least 3s. per bushel of wheat consumed; and pigs, to top up, would produce more. Mr. Lomman advised feeding a little linseed with corn to stock. He had fairly good returns from a small plot of linseed, even this year, and had proved that it was a good change crop for wheat. He harvested it by means of the stripper; but care must be taken to strip at the right time. Mr. Fraser stated that none of his cattle had died since he commenced watering them from a new well he had sunk, the water from which contained 2½ oz. to the gallon, as shown by the salometer.

SHEEP COMPLAINT.—Mr. Peter reported loss of ten sheep from some cause. They lived about three days after being attacked, and on being opened, the kidneys seemed inflamed, and one had clotted blood in the bladder passage. It was possible that the extreme heat caused their death.

Angaston, February 1.

Present—Messrs. F. Salter (Chairman), W. Sage, E. Thamm, J. E. Swann, M. Andrew, S. O. Smith, A. Friend, W. Sibley, E. S. Matthews (Hon. Sec.), and one visitor.

ANNUAL REPORT.—The Hon Secretary's annual report showed that during the past year twelve meetings were held, with an average attendance of nine members. Eight practical papers had been read and discussed, and a number of experiments with seeds conducted, generally with favorable results. The election of officers resulted as follows :—Chairman, Mr. J. E. Swann; Vice-chairman, Mr. W. Sibley; Hon. Sec., Mr. E. S. Matthews.

BEE-KEEPING.—Mr. Thamm read a paper on this subject, as follows :—

Bee-keeping, if well managed and carefully attended to, will be found a fairly remunerative business. It is well for anyone starting to use the bar-framed hives, which are far superior to the ordinary old-fashioned box hives. If a stock becomes queenless, a new queen or brood from another hive can easily be put in, and surplus honey taken when wanted. By the use of an extractor the combs after the honey has been taken can be replaced, and the yield of honey greatly increased, as the bees will at once proceed to refill them. Bee-keeping requires a good deal of study and practice, and anyone starting should not go into it in a large scale until he has had some experience. I would advise him to visit some experienced bee-keeper and watch his methods. Care should be taken to have the swarms strong from the start and keep them strong. When swarming takes place the first swarms are mostly strong, until the end of the swarming some will be found very small. The best thing to do is to take the strongest queen bee from two swarms, and unite the two swarms into one, which is done by stupefying both with smoke, otherwise they will start fighting and kill one of the swarms. After a few days draw out your frames and examine them to see if the queen bee is laying. A good fertile queen will lay several thousand eggs in a day. If you find she is not doing so, destroy her and introduce a new queen, or take a young queen which is still in the cell out of another strong hive and put in. There are various ways of introducing queens. Some stupefy them with smoke, and cover the queen with honey and put among the bees; by the time they have licked her clean they will accept her; or else put her in a cage. After she has been confined for a time they will become used to her. When taking honey use a little smoke to quieten them, then draw your frames, brush off the bees, extract the honey, and replace them at once. The yield of honey can be increased by the use of a perforated zinc division. The holes will admit the working bees, but not the queen, which prevents her from laying in the cells, and the whole force of working bees will be employed in filling the frames or section-boxes which are placed above. The frames with comb honey will sell at about 6d. per pound.

Clarendon, February 7.

Present—Messrs. J. Spencer (Chairman), A. Harper, D. Thompson, A. A. Harper, H. Payne, J. Wright, R. Hilton, J. Juers, J. Piggott, J. Chapman, W. Spencer, A. L. Morphett (Hon. Sec.), and thirty visitors.

FRUIT-GROWING.—Mr. Geo. Quinn, Inspector of Fruit, gave some practical demonstrations in the summer pruning of apples and on budding, in the afternoon; and in the evening gave an address on "Fruit-growing."

FORESTRY.—Mr. A. Molineux, General Secretary, gave an interesting lecture on the "Influence of trees on climate."

Minlaton, February 18.

Present—Messrs. J. Martin (in chair), R. Higgins, D. G. Teichelmann, J. Fletcher, W. Correll, Jos. Bennett, S. Vanstone, Jos. Correll (Hon. Sec.), and one visitor.

MANURES.—Mr. F. H. Snow wrote *re* solubility of Thomas phosphate, which in the Star brand reached as high a percentage as 14.65 per cent. of phosphoric acid soluble in ammonium citrate, and available as plant food.

MANGOLDS.—The Hon. Secretary tabled fine samples of Long Red and Yellow Globe mangolds. He obtained six or seven tons from about half an acre of land, and considered that one of the best uses to which they could put stable manure was to apply it to land suitable for the growth of mangolds. The land should be subsoiled as deeply as possible in the winter or early spring. The addition of 2cwt. of phosphate and 2cwt. of kainit per acre when planting would be beneficial. Mangolds would also do well on the so-called salt patches; on this land about $\frac{1}{2}$ cwt. of sulphate of potash should be substituted for kainit. The mangolds were valuable for cows, sheep, pigs, and poultry, and he thought a patch should be grown on each farm. If this were done they would not hear of so many losses of stock (especially cows and poultry) from

lack of succulent feed, while the production of butter and eggs would be increased. Mr. Teichelmann said growing mangolds, as suggested by Mr. Correll would not pay: some years ago he tried them, but they were a failure. [Still, Mr. Correll raised about twelve to fourteen tons per acre. One failure should not discourage any one.—GEN. SEC.]

Gawler River, February 24.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, J. Hillier, A. Bray, R. Badcock, D. Humphries, F. Roediger, A. Hatcher, H. Roediger (Hon. Sec.), and two visitors.

PREPARING WHEAT FOR SEED.—Members did not approve of treating seed wheat by the hot water system for the prevention of bunt, as pickling with bluestone was simple and effective. Mr. Parker advised blowing the seed wheat before pickling to clean it. This would blow out the bunt balls, also the small and inferior grain. Last year he had some badly-infested grain, which he pickled carefully, and mixed it well with lime, with the result that his crop was quite clean. Mr. Badcock found pickled wheat dried with lime was difficult to sow well and evenly through the broadcast seed sower. Members were all in favor of thoroughly cleaning seed wheat, and considered 4 ozs of bluestone to the bag sufficient, though, if the wheat were bunted, more should be used. The members referred to the necessity for using only pure bluestone, and expressed a preference for the dark crystals.

EARLY GREEN FEED.—Mr. F. Roediger considered King's wheat suitable for early green feed, as it grew very fast. The Hon. Secretary found skinless barley grew quicker than any other grain, and was well liked by stock. He considered Cape barley next best, while mustard was also good. For early feed the land should be prepared early, and well manured, so as to get the benefit of the first rains. Mr. Parker said he grew a variety of green feed crops, coming in in the following rotation:—Rye, Cape barley, wheat, oats. Most of the members considered rye of little value for green feed, notwithstanding its earliness.

Port Pirie, February 21.

Present—Messrs. P. J. Spain (Chairman), E. J. Hector, W. Smith, F. Gambrell, R. F. Humphris, H. B. Welch, A. Wilson, G. Robertson, G. M. Wright, G. Harman, W. Wood, J. Lawrie, and R. J. Ferry (Hon. Sec.).

GLADSTONE CONFERENCE.—Mr. Spain gave a report of the proceedings of the recent Conference of Branches held at Gladstone.

BEST VARIETIES OF WHEAT.—Considerable discussion on the best wheat for this district took place. Mr. Lawrie had best results for some years from Smart's and Early Para wheats, which, when sown early, would in his opinion beat any others grown in this district. From fallow they yielded 15 bush. to 20 bush., and from stubble land 8 bush. to 11 bush. Budd's wheat was also a good one for this locality. Smart's was free from rust, grows to medium height, but shakes badly, and is weak in the straw. Mr. Welch found Budd's very satisfactory for a year or two, but this season it had not done so well. Ward's Prolific did best with him. Farmers should not forget to sow rust-resistant wheats, and these two were satisfactory in this respect. As an experiment he sowed Scotch Wonder, Leak's Rustproof, and Ward's Prolific in the same paddock, and they returned 14 bush., 15 bush., and 17 bush. respectively per acre. Mr. Gambrell showed excellent heads of wheat, also grain of Smart's, Baroota Wonder, Early Para, Budd's, and Murdoch's Bluff, grown last season. He

considered Baroota Wonder a first-class wheat; in a good crop it shook out no more than many other kinds; last season it averaged 10bush. per acre. Smart's does well with him, returning about the same as Baroota Wonder; the grain of both weighed 64lbs. per bushel. Early Para and Budd's did not do so well. He liked Murdoch's Bluff; it produces a plump grain, and yields well. Mr. Wright had best results from Early Para; it was not profitable, however, for hay. Baroota Wonder was very prolific, but is apt to shake out and lay down. Budd's and Gluyas' wheats also gave good returns. In future he intended to go for the early varieties. Mr. Robertson favored Early Para. The early wheats should be grown more extensively. Ward's Prolific was a splendid variety; it had been the mainstay of the farmers in the surrounding district for years, and could not be beaten for the main crop. Mr. Smith had grown a number of varieties, and proved Carmichael's Eclipse, Early Para, Budd's and Smart's to be very good. The first was especially good; and, notwithstanding the season, he averaged 5bush. from over 250 acres of this wheat. It stands well, does not shake out or blow down, has not been attacked by rust though varieties alongside were very badly affected. Smart's was a good wheat, but very susceptible to bunt. Murdoch's Bluff and Smart's sown together had done well. Mr. Humphris had a preference for Ward's Prolific. Smart's was also a good wheat, but rather subject to bunt. One season he grew Ward's Prolific, Tuscan, and Smart's under similar conditions, the yields being 18bush., 17bush., and 3bush. to 4bush. per acre respectively. Smart's was badly affected by rust. Last season, as an experiment, he put in five bags each of Gluyas', Carmichael's Eclipse, and Budd's, all under same conditions. They were drilled in with fertilisers on fallow land in time to get the benefit of the first April rains. They all grew rapidly, and in June horses were turned into the crop to eat it down. Gluyas' went 10bush. and Carmichael's Eclipse 11bush., but Budd's did not do well. Carmichael's Eclipse does not shake out, thrashes easily, makes good hay, and has a grain like Violet Pearl. This and Gluyas' are of the same class as Ward's Prolific, but the second wheat makes better hay, though not so heavy as Ward's. The latter had served him best from year to year, and he intended to continue to grow it although the merchants docked it a little. It grows well on most soils. Baroota Wonder had given him poor results. Early Para was liable to rust, hence risky in this district.

Kanmantoo, February 24.

Present—Messrs. John Downing (Chairman), W. G. Mills, John Mullins, P. Lewis, F. Lehmann, A. D. Hair (Hon. Sec.), and one visitor.

EXCHANGE OF SEED WHEAT.—A member stated that in order to get a change of seed wheat he arranged with a farmer over the border to exchange two bags of seed wheat. Owing to the duty and carriage coming to more than the wheat was worth he had to give up the idea of getting this seed pending the accomplishment of Federation.

DEHORNING CATTLE.—Mr. Lehmann pointed out that the horns on young cattle could be prevented from developing by applying lunar caustic to the "bosses." Care should be taken not to get it on the hands; otherwise the experience would be the reverse of pleasant.

DAIRYING.—Mr. Mullins considered the district west of Kanmantoo more suitable for dairying purposes than their immediate neighborhood, where it was very dry and trying in the summer, and not possible to grow green feed, except at considerable expense. Mr. Downing thought their district could compare favorably with other districts in the quality of the butter, meat, flour, and wheat produced.

Quorn, February 25.

Present—Messrs. R. Thompson (Chairman), F. Herde, G. Altman, W. Toll, C. Patten, J. Johnson, H. Cowan, James Cook, and A. F. Noll (Hon. Sec.).

PICKLING WHEAT.—The Chairman initiated a discussion on this subject. Nearly all the members took part, and it was considered the best way was to pickle on the floor, or some shallow receptacle, and using a certain quantity of bluestone per bag. The wheat should be thoroughly shovelled over, so that every grain is wetted.

SUMMER FODDER.—The Chairman reported having sown maize eight weeks ago, and it was now 10ft. in height. Some put in seven weeks since is 8ft. high, the stems being about 2in. in diameter. The land was trenched 18in. deep, and well manured. The crop was watered twice a week. His cow greatly appreciated the green stuff, and the supply of milk and butter had been increased.

Forest Range, February 23.

Present—Messrs. J. Vickers (Chairman), H. H. Waters, S. A. Collins, W. Cherryman, A. Green, J. Green, J. Sharpe, Geo. Monks, H. Caldicott, R. E. Townsend, J. G. Rogers, R. Hackett, J. Caldwell (Hon. Sec.), and two visitors.

FRUIT-GROWING.—This meeting was held at the residence of Mr. J. C. Grasby, Glengyle, Balhannah, to inspect results of the adoption of the Tasmanian system of summer pruning of apples. The orchard is over thirty acres in extent, the trees being of various ages. During the inspection Mr. Grasby gave demonstrations and explanations of the system, which was more for the development of fruit buds than for forming the tree, only the lateral shoots being pinched back in summer, the leading growths being winter pruned. The trees are kept low enough to allow of the fruit being gathered from the ground. When starting the young tree it is kept cut back short until a dozen or so stout stems are produced from 18in. to 2ft. from the ground, after which scarcely any forks are allowed, forming in time a goblet-shaped tree without any centre or main stem. The merits of this system it is claimed are—the stems being stiff carry the fruit without breaking down or spreading very much, the fruit is not so injured by rubbing against the branches, the capacity of the tree to produce fruit is increased, and the trees can be more easily sprayed or examined for traces of codlin moth. Mr. Grasby is a strong believer in the benefit of spraying for apple and pear scab, and gave the visitors some practical illustrations of the results of this work. He thought it would take about three hours to carefully summer prune a fair-sized apple tree. Mr. Monks thought Mr. Grasby deserving of every credit for the pluck he had shown in giving this system a thorough trial; he believed he was the only orchardist in the neighborhood who had taken it up. Although at first opposed to it, Mr. Monks was confident that it was the best system to adopt; if they were to cope with the codlin moth they would have to follow Mr. Grasby's example. Mr. Vickers approved of the system, and believed they would get more regular crops. Mr. Hackett thought the extra cost of pruning would be more than compensated for by the greater ease in gathering the fruit; different varieties would doubtless require somewhat different handling. Mr. Waters said he tried this method of summer pruning on one of his trees, and got a better return than from any other tree in his orchard. A vote was taken, with the result that ten were in favor of and one opposed to the system. A vote of thanks was accorded to Mr. and Mrs. Grasby for their hospitality.

Lucindale, February 18.

Present—Messrs. E. Feuerheerdt (Chairman), H. Langberg, W. Dow, A. Lobban, A. Dow, L. McInnes, B. Feuerheerdt, and E. E. Dutton (Hon. Sec.).

STOCK COMPLAINTS.—Mr. Langberg reported that a few of his sheep were suffering from blindness. Mr. Dutton reported loss of several head of cattle from, he believed, impaction. Mr. B. Feuerheerdt showed tubercle bacilli by means of the microscope, also spores of smuts.

VISIT TO HOMESTEAD.—This meeting was held at the residence of the Chairman, at Crower. The small stud of Romney Marsh sheep was inspected. and the opinion expressed that the rams of this breed would be in demand for production of lambs for export. A good frame for stretching sheepskins was noticed. The poultry included Pekin ducks and Langshan fowls, the latter being recommended as good layers and general all-round birds. The experimental plot at Rocky Gate, consisting of an enclosure of four acres of sandy swamp was also inspected. Amongst the crops noticed there were patches of potatoes, lucern, Bokhara clover, mangolds, kale, rape, melons, pumpkins, maize, tomatoes, turnips, and various grasses, the plot forming a very attractive sight.

Dowlingville, February 17.

Present—Messrs. T. Holland (Chairman), T. Kenny, F. Roberts, S. Tee, G. Inkster, H. Crowell, J. L. Broadbent (Hon. Sec.), and three visitors.

SEED DRILLS AND MANURES.—Discussion took place on the good and bad points of the supposed improvements in this season's seed and fertiliser drills. Members reported on various manures tried last season. Mr. Kenny had no results from Gambier Island guano. Some members had good results from guano super., others very poor. Thomas phosphate had given unfavorable results, except when put in early, when the returns were very good. English super. had proved good all round.

BLUESTONE.—Members thought bluestone required testing as well as manures to prevent fraud, as some of the so-called bluestone was useless for pickling purposes.

CUTTING MALLEE SHOOTS.—Mr. Kenny asked best time to cut and burn mallee shoots. Mr. Tee said one case he knew of they were cut in March and left for twelve months, and very little grew on them; he favored burning the stubble and not cutting the shoots.

Hahndorf, February 25.

Present—Messrs. A. von Doussa (Chairman), F. A. Sonnemann, J. C. Rundle, A. C. Paech, W. Liebett, and D. J. Byard (Hon. Sec.).

FRUIT PESTS.—Mr. Liebett reported having sprayed a pear tree, while in bloom, with kerosine and soapy water, with very good results. [For suppression of what?—GEN. SEC.] Mr. Sonnemann referred to the prevalence of the codlin moth in the district and to the steps taken to cope with it.

SUMMER PRUNING.—Several members testified to the value of summer pruning of fruit trees.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Labor Copartnership and the Factory System.

The great dimensions of the factory system, and the distinct and dominating place and function that capital has obtained in that system, have produced an overpowering idea that labor is now almost hopelessly severed from what in former days was largely under the individual control of the worker. To quote the graphic words of Arnold Tonybee, "the slowly dissolving framework of mediæval industrial life has been suddenly broken in pieces by the mighty blows of the steam engine and the power loom." These blows have largely driven labor and capital industrially and socially asunder. Large masses of population have been separated in economic interest, technical skill, and social standing from a comparatively small part of the community who have grasped almost exclusive control over one essential means of production, the enlarging necessity for capital in modern industries. In none is this more pronounced than in the factory system.

The average man, under any industrial or social system, has a tendency to fixity of ideas, habits, and character. The fewer or the more confined his points of contact and intercourse with his surroundings the more emphatically does he become their victim. The sudden and wide divergence of the functions and of the more superficial interests of labor and of capital have had this effect, and have impressed the bulk of those most immediately concerned as final and permanent results to which they have to adjust themselves with or without protest.

The student of human systems knows, however, that all human affairs have hitherto been in a state of constant flux, and he reasonably suspects that the present system of industry has not come to stay, but has within itself the elements of change. So far the advantages of the factory system have been, in the main, the outcome of the sub division and specialisation of labor, accompanied by actual or suppressed competition of the separated agencies within what may be called the industrial unit of any given kind of production. But the economic thinker realises from theoretical reasons, and the practical man of industry from the practical facts of a work-a-day life, that as the subdivision of industry goes on the necessity for co-operation increases both in extent and in intensity.

It is in the fundamentally and increasingly co-operative character of industry that is rising into public view that labor copartnership finds its justification, and that makes its advocacy and practical application so full of significance and promise. For opening up and successfully testing the hitherto practically unused sources of wealth of the co-operative side of our modern competitive industries there is none so well guaranteed, both by theory and practice, as the method of allowing labor to share in the profits, the control, and the responsibilities of capital, and, in a general way, in the administration of industry.

That such an arrangement puts the workers into more intelligent, sympathetic, and better financial relations to the general organisation of industry, as well as to the special difficulties of management, I have had ample means of judging, and I am convinced that the *a priori* belief of social reformers is warranted by the facts of industrial practice. The workers as a whole are made more keenly alive to the success of their industries at all possible points of increased efficiency, varying, of course, according to what they have at stake and according to their general intelligence and their sensibility to great moral

ideas. New sources of inventions, by inciting so many minds throughout the factory system, will be more likely to be discovered, and old sources of efficiency and profit will find a fuller and fairer field from the heartier co-operation in what makes for fullest and best results.

General causes are working, and will in all likelihood work, more effectively in the future in the same direction. General and technical education is providing fuller opportunities for the gifted among the toilers as well as for the general mass for fitting themselves for larger industrial efficiency and responsibility. Trade unions and other co-operative agencies, and even the organisation and administration of the modern athletic associations and leagues, are producing habits of large and effective association in the community generally and among wage-earners in particular. The actual achievements in copartnership industry, reaching at the present a total of some 157 societies, employing a capital of over £1,000,000, and securing a trade of over £2,000,000, show that the special and general causes mentioned are operating and succeeding, enabling the workers to break through the initial difficulties of a new régime.

An appeal to facts proves that labor copartnership may be adjusted to the requirements of the factory system. It has been applied successfully in firms of the fully developed factory type both in the cotton and woollen industries. Other copartnership industries, financed and managed by working men, have attained the factory stage by gradual increase of capital, organising ability, and labor. The incorporation of the practice in the Scottish co-operative wholesale system shows that it may accompany the development of one of the largest and most complex forms of industrial enterprise.

The greatest difficulties to its progress in the factory system lie in the vested interests and the settled practices of the capitalistic side of the system, and in the want of hope due to a restricted outlook in the general conditions of their industrial lives on the part of the workers. But the exhausted development of the system on the purely competitive and capitalistic lines will force, and already is forcing, the attention of the more enlightened and humane capitalists to the underlying and untried co-operative resources of the system. The growing general intelligence, sharpening into special knowledge by their own co-operative ventures, will liberate the wage-earners from the thralldom of restricted habits and views of industrial life, and awaken them to the great possibilities of their industrial conditions through the heartier and more intelligent co-operation of labor and capital.

When that time comes the results will not only be a more efficient use of this great product of the industrial revolution, and consequent increase and better distribution of matured wealth, but a nobler enrichment of character, by acknowledging and deliberately utilising the most fundamental part of the factory system—the enormous scope it presents for the knitting together of men in a voluntary and harmonious, in place of the present compulsory and often wasteful, brotherhood of industry.—ROBERT HALSTEAD, in the "*Trade Unionist*"

The Labor Bureau.

The following particulars have been supplied by the Superintendent of the Labor Bureau, showing the number of the persons registered at the Central Bureau and country agencies :—

Number of persons registered at the Central Bureau	2,259
Number of persons registered at the Country Agencies	2,376
Total	4,634

Number of persons for whom work has been found by Government departments and private employers since January 4, 1899:—

Laborers	637	Junior Porters and Carriage Washers...	6
Masons and Plasterers	7	Cleaners	4
Granite Dressers	16	Packers	3
Carpenters	11	Linemen	3
Painters	27	Watchman	1
Boilermakers, Rivetters, Youths, Blacksmiths, Strikers, Fettlers, Brass-finishers, &c.	66	Cooks	5
Patternmakers	2	Wellborers	4
Fitters	22	Grand total.....	<u>814</u>

A. RICHARDSON, Bureau Clerk.

One thousand three hundred and thirty-nine men have been found employment through the Labor Bureau since its establishment.

The Federation of Trade Unions.

Now with trade brisk, wages rising, employment abundant, and workmen to to all appearance, upon the whole, disposed to make the best of such a state of affairs, the wisest policy for employers, as well as employed, would be to rest satisfied; and by promoting peace and quietness all round, to ensure its continuance for so long a period as possible. There is at present no serious disturbance in any of our staple industries. A good year has passed away; and the present year has been ushered in with activity almost everywhere, and a fair probability of plenty of work for many months to come. There are evidently some people, however, who regard this good time for working men and their employers as an excellent opportunity for tactics hitherto employed only, or chiefly, in hard times, when wages have been so low and work so scarce as to cause hardship and grievous trade disputes, strikes, and lock-outs. They are clearly not disposed to let well alone—probably because when business is brisk labor agitations are at a discount, and their promoters, aiders, and abettors not being sufficiently in evidence—as it were, out of sight and out of mind—some of them may be afraid that their occupation may soon be gone. It is not easy, at any rate, to understand why at such a time a revised scheme should be in course of elaboration for a general federation of the trade unions of Great Britain and Ireland. The prospectus is, it is true, not limited to the internal affairs of trade unions. It contains a very large order indeed, comprising some arrangement by which the proposed federation of all trades shall take in hand the controlling of all trade disputes and the establishment of a labor bureau “for the collection and tabulation of information and statistics.” But as the scheme had been revised by the committee of the London Trades Council, and will be shaped chiefly by its discussions, its object may be readily guessed as militant rather than peaceful or conciliatory. Its *raison d’être* remains to be proved. Of commercial and industrial statistics we have a plethora, and of plans for arbitration, mediation, and conciliation enough and to spare, while the small success of the Conciliation Act affords but little encouragement to any further piling up of statistics for that purpose; and labor bureaus, either in this country or in France, have done little or nothing to remedy any of the evils arising from the existing relations of capital and labor in any trade.

The real aim and purpose of this proposed federation of trade unions is, no no doubt, to fight if necessary in future the growing federations of employers. That is clear, however it may be made obscure by the widening of the basis of the scheme or by multiplying the objects proposed to be sought by clubbing the whole of the trade unions into one compact organisation. Will such a process

promote industrial peace? There is a great cry abroad at present against the incessant growth of armaments in Europe, and if the various States were to be formed into two large groups in direct antagonism to each other, it is certain the peace of Europe would be imperilled to a far greater extent than it is in the present rather vague condition of its chief alliances. The proposed federation is avowedly, however, to be formed with a view to bring to bear on all strikes and trade disputes the power of all the trade unions in the United Kingdom; and for this purpose its management and conduct are to be vested in the hands of a council representing all trades, which will not only take cognisance of every trade dispute, large or small, in any part of the kingdom, but will practically be responsible for all strikes—having full “power to withhold the support of the federation from any federated union that enters on a strike without its knowledge or consent.” But that is only a plausible way of stating a more portentous power this council will possess as a kind of directory of an industrial national convention of all trades, to order strikes it may regard as necessary in the case of any particular trade, and to back up its case with the full fighting trade union strength of all the associated federations of British workmen. This scheme bears intrinsic marks, in fact, of its origin. It has been evidently suggested by the refusal of certain federations to go to the assistance of other federations of workmen beaten in trade disputes by the employers’ federations, which, owing to the persistent aggressiveness of certain trade union leaders, have been greatly increased in numbers and strength during the last twelve months. It is simply intended to counteract the results of this extensive federation of employers; and if carried out it will tend to aggravate all the existing evils of industrial warfare to an extent it is hardly possible to estimate. The examples of the United States and Australia show that the formation of employers and employed into two great camps is sure ultimately to bring about an “Armageddon” that must leave one side or the other absolute conqueror. It is the capitalists, however, in the United States and in Australia who have come out the stronger after such contests, and such will probably be the result of another experiment on a large scale of this kind of federation and counterfederation of capital and labor of all branches of industry, for fighting out disputes on work and wages to the bitter end.—*Newcastle Journal*.

The Future of the Working Classes.

SELF-HELP—HIGHER WAGES—SOCIALISM.

In the Throckley Co-operative Hall, on December 28th, Mr. Thomas Burt, M.P., lectured, under the auspices of the educational department of the Throckley District Co-operative Society, Limited, on “Co-operation, Education, and the Future of the Working Classes.” Mr. John Eggie presided over a large audience, amongst whom were Messrs. John Steel, R. Hutchinson, R. Turnbull, M. Kirton, and Wm. Musgrove. Mr. Burt, who was cordially received, said he was delighted to address a meeting under the auspices of the educational department of their co-operative society. He was delighted that the society was flourishing, and that they had such a department. In the course of his address he said:—“Whatever be the future of the working classes, of the co-operative movement, of the other great social agencies that are at work among the masses of the people of this country, their future will depend more upon their education—using that term in the highest sense (not merely the education of the intellect, not merely the gaining of information, but the development of the whole man, physical, moral, and mental)—than

upon any other single factor. (Applause.) At the present time, said Mr. Burt, social questions are coming very much to the front, not only in our own country, but in all the countries of the world. Social and industrial problems are the great questions of the future. I have never felt altogether satisfied with our present industrial system. I have always felt, as a workman, that there is some anomaly, something amiss as it were, in the fact that, although labor is the greatest factor in the product of wealth, yet no man ever becomes wealthy, ever 'makes his fortune' merely by labor. He has to tax other people's labor in some shape. He has to employ others before he can become prosperous himself in the ordinary use of that term. I am not going to stop to inquire whether it is desirable that there should be great fortunes. Perhaps it is largely an evil, perhaps it is undesirable; but I do believe that it would be better for everybody, not only for the poor struggling man, but for the well-to-do also, if there were a more equitable distribution of wealth. A workman, however fortunate he may be in his labor, has to be exceedingly fortunate if he does not end his days in the workhouse. Of course a great deal of the inequalities that exist in connection with our social system are, to a large extent, the result of 'man's inhumanity to man'; sometimes a want of self-control, of thrift, and of provident habits on the part of the worker. Still, I have noticed that the workman, who is, after all, the main factor in the production of wealth, has to be very careful if he does not care to be dependent upon others for his support towards the latter end of his life. I have never been able to come to the conclusion that this is a divinely ordained state of things (Applause.) It belongs very largely to a system that is at fault. But I should not like to be misunderstood upon this point. The present has come out of the past, the future will come out of the past and the present, and we cannot have any great revolutionary changes. This is really a question of evolution, rather than of revolution. I believe that in the main, although I do not disparage the influence of legislation upon the future of the working people, my faith is, and always has been, mainly in the great voluntary associations of the workmen—their co-operative societies, their trades unions, their friendly societies, and other agencies of a voluntary character. These agencies are the glory of our country, and have done more than anything else to put the working classes of this country in the position in which they now stand, and that is amongst the highest of the working population of any country in the world. This principle of self-help has done more than legislation, more than kings or courts, to elevate and improve the condition of the great masses of the people of this country. (Applause.) Matters, despite all that can be said to the contrary, are much better now than they were fifty or sixty years ago. Fifty or sixty years ago the pauperism in the country was almost unmanageable. The wages of workers are higher now than they were in the time of our fathers. The purchasing power of money is much higher than it was. The hours of workers are less. Still, although a larger proportion of the population are going into higher-paid occupations, the struggle and the strain of life is not less intense than it was. One of the difficulties that we are having to face, and one which I consider of the utmost possible importance at the present time, is the strain upon the infirm and the aged, owing to the rush and hurry of our modern industry. This is becoming enormously intensified. We are progressing, however, and do not let us spoil a good case by misrepresentation and exaggeration. What is to be the cure? My hope and faith are mainly centred upon the great voluntary agencies that are at work. Some of our friends are in favor of nationalising everything. They think that socialism will be the panacea for all our social difficulties. I am not here to attack or to criticise those who may hold views of that kind. I believe that socialism has done a great deal in the way of calling attention to the faults and evils and vices of our present social system—(Hear, hear.)—and, so far as it directs attention to these evils and

rationaly discusses the cure for these evils, I have not a word to say against it. Its cure, however, is rather too far in the future. It may be that some great evolutionary process is going on that may prepare the way for nationalising. The nation does some things very well through its various Government departments. It does some things very ill, and, although the time may come when we may have some evolutionary process bringing about a change of that kind and inducing Governments to deal with some matters that are now carried on by private enterprise or by corporations. still, for my part, I prefer voluntary methods, methods of self-help. Our trades unions and co-operative societies are grappling more directly and more effectually with some of the evils that beset our present industrial system. We have to begin, if we wish to be practical reformers, by accepting things as they are. The common problem—yours, mine, everyone's—is not to fancy what were fair in life, provided it could be, but finding first what may be. Then find how to make it fair by all our means. That is the attitude taken up by trades unionists and co-operators. I have had the honor for more than thirty-three years to be the general secretary of a trade union—(applause)—and I am not likely to say a single word by way of disparaging the value of unions. Unions have given the workman better wages, shorter hours, better conditions of labor than he had before. They have enabled him to stand erect before his employer and to assert his manhood and his rights in fair argument. But I have always regarded co-operation as a higher principle of unionism than our ordinary unions. The trade union has been called an industrial army. It has to fight its way. Latterly, fortunately, it has fought its way by weapons of reason to a larger extent than formerly. Co-operation is unionism, but lifts union to a higher level, to an ideal at which it aims. My hope for the future of the working classes and the masses of this country is mainly centred in the co-operative movement." Mr. Burt went on to quote figures bearing upon the great extension of the co-operative movement, and mentioned that all this extension had taken place within a generation. The figures surely were eloquent in the testimony which they bore to the courage, self-help, management, ability, and intelligence of the working population of the country. He favored the copartnership principle, believing that before we could carry our great system up to pure co-operation we should have to pass through the profit-sharing stage. He concluded by expatiating on the valuelessness of material wealth, unless accompanied by good mental and moral qualities. (Applause.)

On the motion of Mr. Steel, seconded by Mr. Hutchinson, a vote of thanks was most heartily accorded to Mr. Burt.

In reply to a question as to whether co-operators should be directly represented in Parliament, Mr. Burt said he thought it would be a very good thing indeed. He thought the House of Commons should be a thoroughly representative assembly in the sense of having all great movements with their accredited and competent spokesmen there. At the same time, he was not in favor of class representation.

The usual compliments to the chairman closed the meeting.—*Newcastle Leader.*



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NOTES AND COMMENTS.

The rapid spread of phylloxera in Victoria is a very serious matter, not only to the vigneron of the sister colony, but to our own vinegrowers also. There seems little doubt that the Victorian growers will now have to resort to the use of resistant stocks, and as this means really the perpetuation and continued spread of the pest it is only a question of time when, notwithstanding all our precautions, that phylloxera will be introduced into South Australia. It behoves our vinegrowers, therefore, to give very careful consideration to the proposed Phylloxera Bill, to raise funds from which expenses in combating any outbreak can be paid. In any case, any infected vineyard would be destroyed by the authorities, but there is at present no possibility of the unfortunate owner receiving compensation for his loss. The Phylloxera Bill is doubtless susceptible of improvement, and the energies of the vigneron should be devoted to making it as acceptable as possible to the majority of growers, and then to getting it passed by Parliament as early as possible. To wait until we get the phylloxera in the colony before taking necessary steps to deal with it would be suicidal.

After the grapes have been gathered it is the regular practice with some vinegrowers to turn in horses, or cows, or sheep, to browse upon the foliage of the vines. Professor Perkins agrees with all other competent authorities that this is undoubtedly injurious to the future well-doing of the vines. The foliage should be allowed to remain as long as it is green, when it will drop off.

Every person interested in the cultivation of plants of any kind, and especially of grape vines, should carefully read the excellent paper on manuring, &c., in the present issue, as read by Professor Perkins before the Vignerons' Association.

When pickling seed wheat it is very important that pure sulphate of copper (bluestone) should be used; but it is a fact that greenstone ("copperas," or sulphate of iron) is sometimes used as an adulterant. Several farmers have complained that "colonial" bluestone is not pure—and, indeed, is very inferior to imported. The question then arises "Who are the makers of this so-called

'colonial' bluestone?" Certainly not the Wallaroo Smelting Works. The Telegraph Departments of South Australia and New South Wales use none other than Wallaroo bluestone, and they would not do this if it were not of the best quality. Farmers should see that the bluestone is put up in kerosine boxes, with new lids, upon which "WALLAROO" is stencilled. The small crystals are best because they dissolve quickly. The large crystals are best for telegraph batteries because they dissolve slowly.

Professor D. McAlpine, Vegetable Pathologist, Department Agriculture, Victoria, writes with respect to *Cladosporium herbarum* that, although he has always found it associated with other parasitic fungi where "takeall" in wheat plants is concerned, it is often found also on wheat plants after they have produced good crops, and he is not at all satisfied that this fungus is the cause, or one of the causes, of "takeall." At best it is a feeble parasite, attacking only such plants that are weakened from other causes; and if the conditions of the wheat plant at an early stage were such as to favor the growth of the fungus, then it would be likely to seriously interfere with growth.

During this month a sample of so-called superphosphate was sent to the Agricultural Bureau for analysis. It contained only 1.26 of soluble phosphate (tribasic phosphate made soluble), and was worth less than 4s. 6d. per ton. Another so-called super. actually contained less than 1 per cent. of soluble phosphate; and another fertiliser, for which something over £5 per ton is asked, contains about 6 per cent. of insoluble phosphate and a little ammonia and potash, worth in all about £1 5s. per ton. This shows the necessity for farmers insisting on the seller giving a guaranteed analysis with every parcel sold.

When manure is buried deeply it is likely to become a "permanent investment," giving little or no return as interest. Farmyard manure, especially, should be harrowed in on or just under the surface. Every soaking rain that falls will dissolve and carry down a proportion of the salts, which will be taken up by the roots of the plants; but if put down too deeply the same moisture will probably carry the plant food away from the roots.

Mr. A. Crawford, Dairy Instructor Department Agriculture, West Australia, is another specialist who bears testimony regarding the economy of feeding cheap wheat to pigs. He had a lot of good-class pigs, and fed them on wheat. The younger the pigs were the greater the weight of pork they produced from a given quantity of grain. Pigs weighing 40lbs. to 80lbs. gained 1lb. in weight for each 3½lbs. of grain consumed; pigs between 100lbs. and 200lbs. gained 1lb. for each 6lbs. grain eaten; and between 250lbs. and 400lbs. it took 12lbs. grain to make 1lb. meat on them. Best results were got from raw and crushed grain; next from whole uncooked grain, but cooked grain was unsatisfactory. When separated milk or whey or milk of any kind was used, the results were better and gave 10 per cent. to 15 per cent. better returns than when omitted. Mixed grains gave better results than wheat or maize or barley fed separately. Mixed grains with milk gave best returns of all. Pigs can be fed at first on any green stuff, and be finished off on grain and milk.

During three years experimental feeding of pigs at Wisconsin (U.S.A.) Agricultural Experiment Station fifty-one pigs were fattened on whole maize and fifty-one were fed on ground maize. Those fed on whole corn gave an average daily gain of 1.34lb., and those fed on meal made a daily average gain of 1.63lbs. a difference of 0.29lb daily, or about 2lbs. per week through feeding meal. In all cases a little middlings was also given to maintain the good health of the pigs. By grinding the corn to meal a saving of 39lbs. was gained on every 498lbs. The pigs fed on meal ate more daily than those fed on whole corn, and thus made a more rapid daily gain. The trials lasted twelve weeks with each set of experiments, with pigs ranging from 180lbs. to 350lbs., and the results were uniform in all cases. A ration of 459lbs. corn meal produced 100lbs. of live-weight gain, and 498lbs whole maize produced 100lbs. live-weight gain. As the pigs ate more and fattened more quickly on meal, the time and labor as well as the food saved should be taken into account.

It is almost a universal practice with milk suppliers at creameries and butter and cheese factories to carry back to the farm the skim milk and whey in the same cans in which they brought the whole milk. Even when there are facilities at the farm for thoroughly cleaning the cans it is a bad practice to defile the cans with skim milk or whey, because there is always a danger of injuriously affecting the next lot of milk that is put into the cans, and thus affecting the whole of the milk taken to the factory on that day. The only proper way to cleanse a can is to first thoroughly wash it with *cold* water, then to scald with boiling water or steam. Half a gallon of tainted milk is sufficient to spoil 1,000galls. of sound milk supplied to a cheese factory.

Our Dairy Instructor, Mr. G. S. Thomson, is doing yeoman service in visiting various dairy factories inspecting and in educating where required. At one centre not very distant from Adelaide he has been conducting several demonstrations in the art of cheese-making under various systems, and has proved the value of "pure cultures" of beneficial bacteria. Some of the suppliers of milk to this factory have not been sufficiently careful to cleanse their cans after having taken whey back in them, and the effect of this want of cleanliness was not apparent until after the milk had been mixed with that of other suppliers, placed in the large vats, heated, and renneted. Then the trouble began; the bad milk began to turn all the rest bad, and a strong evil odor arose from the vat. But the pure culture started its beneficial action, and by the time the curd was ready for the press the evil effects were completely overcome.

The milk separator takes out most of the impurities of the milk passed through it, and deposits a good deal of slime in a dense leathery mass on the sides of the bowl and amongst the discs. In this slime are to be found all sorts of microbes, bacilli, germs, and other objectionable matters, not omitting the bacilli which cause consumption or tuberculosis. Very many people think it a pity to "waste" this slimy matter, so they feed it to pigs, poultry, dogs, etc., with the result that various diseases are thus communicated to their domestic animals, and later on to their own families or other people. Moral—Be careful to burn the slimes from the milk separators.

Tuberculosis in cows is called "consumption," and "decline" when it attacks mankind. This disease is readily transferred from cattle to mankind, and from mankind to cattle. The dry spittle or "phlegm," or the "saliva" or "saliva" of mankind or cattle suffering from the disease is filled with seed of the complaint, and the dust of this will convey the disease into the lungs of the people or cattle who breath it. The flesh of a diseased cow or bullock may also convey the disease to any person eating such flesh if it has not been thoroughly cooked. The most prolific causes of tuberculosis, or consumption, in mankind are the milk of cows which have udders affected with tuberculosis, and the dried-up "phlegm" or "sputa," expectorated or discharged from the mouths and nostrils of diseased people or cattle. All danger of infection from milk or flesh of diseased cows or cattle can be prevented by simply subjecting milk to very nearly boiling point of temperature for three minutes [If quite boiled an unpleasant flavor is imparted to the milk] and by thoroughly cooking the meat. The germs of tuberculosis are all destroyed at a temperature of 180° F. within three minutes.

If a baker found that by accident he had dropped a little arsenic into his batch of bread, and yet supplied that bread to his customers, he would be held liable to hanging if one of those customers died through eating it. The same penalty would probably attach to any other person who deliberately or knowingly dispensed or sold articles of food or drink containing subtle poisons. But what about the man or woman who owns cows which are evidently diseased with tuberculosis, but who continue to supply the milk to their unsuspecting customers? It may be argued that these people may not be aware of the fact that the milk of such cows is dangerous, but it is certainly the duty of every owner of cows to watch the state of health of the animals, and when any of them begin to cough or to show any sign of indisposition to at once find out the cause. It will affect the rest of the herd, most probably affect the owner's own family, and almost certainly extend to many customers of milk from his dairy.

Sweet cider is a healthy and pleasant beverage for spring and early summer, and may be made absolutely non-intoxicating. Press the juice out, run it through a jelly-bag or flannel bag filter, then place in clean bottles filled to the lower end of the neck, place these in a boiler of water to within 2in. of the top of the bottle-necks, bring the water to a boil, let boil three minutes, have corks ready in boiling water; cork the bottles with these, seal over, and put aside to get gradually cold. The liquor will keep good for years and until twelve hours after being opened for use. The juice of any other fruit may be kept good for any length of time by the same method.

An arrangement has been made by a few prominent fruitgrowers with Mr. Foureur (well known in connection with manufacture of South Australian champagne) to experiment with a few tons of apples in the manufacture of sparkling cider. There is very little doubt that Mr. Foureur will be successful, since he is in possession of deep cellars, where he can ensure a constant low temperature and perfect and slow fermentation. It is proposed to form a co-operation amongst the orchardists, and utilise the apples and pears of second and lower grades, that should not be exported, for manufacture into sparkling cider and cider vinegar.

Dr. Jas. Fletcher, F.R.S.C., &c., Entomologist to the Canadian Department of Agriculture, reports that few insects are more readily controlled than the caterpillars of the small white cabbage moth (*Pieris rapæ*). The best remedy is Pyrethrum powder mixed with four times its weight of common flour, and then kept in a tightly-closed vessel for twenty-four hours until the poisonous principle has permeated the whole mixture. A small quantity of this mixture dusted over the affected plants very quickly destroys the caterpillars, as Pyrethrum or insect powder kills by contact either dry or as a decoction.

It is not generally known that tomatoes can be picked green when fully grown, and will ripen on shelves if placed singly. At the end of the season there are generally a good many tomatoes on the plants which would decay if left out in the cold and wet. The season can be prolonged for a month or two by gathering such fruit and placing them in a warm place where there is a good light.

FERTILISERS FOR POTATOES.

In the August, 1898, issue of the *Journal of Agriculture and Industry* we published particulars of a very successful mixture of fertilisers used in America for potatoes, together with formulæ showing how the same quantities of fertilising ingredients could be obtained from the various fertilisers offered in South Australia. The Secretary of the Mount Compass Branch reports that nearly all the gardeners in the district followed one or other of the formulæ to a certain extent, with satisfactory results. The land generally is reclaimed peaty swamp, requiring a very large amount of labor to bring it into workable condition. Mr. Sweetman, one of the residents, applied 300lbs sulphate of potash, 5cwts. bonedust, and 5cwts. super. per acre, and harvested 12 tons of potatoes against 8 tons last year from a good dressing of bonedust alone. The dressing of potash was unnecessarily heavy, and probably half the quantity would have been sufficient, lessening the cost of the manure to a very material amount, as the sulphate of potash costs 12s. 6d. to 15s. per hundredweight. Mr. Jacobs applied 4cwts. bonedust, 3cwts. super., 1cwt. muriate of potash, and 80lbs. nitrate of soda, and took 8½ tons per acre against 5 tons in each of the two previous years, when he manured with 6cwts. bonedust per acre. The bonedust and potash were put on the land two months before planting, when it was dug rough. The super. was applied just before planting and harrowed in, and the nitrate of soda in two dressings, one just before hoeing and the other just before banking. Owing to the season being better than last the yields from potatoes was generally better than the previous crops, probably 1½ tons to 2 tons better.

TANNING SKINS AND HIDES BY "LIGHTNING" PROCESS—Over two quarts of bran pour five or six quarts of boiling water, then strain. Make an equal quantity of salt water by putting into water, blood warm, as much salt as will dissolve. Mix the bran and salt water, and to each gallon of the mixture when not more than lukewarm add 1oz. of sulphuric acid. Then immerse the skins, stirring them occasionally until tanned. Opossum skins will tan in twenty minutes; sheep, kangaroo, and wallaby skins in from forty to sixty minutes. When tanned rinse in water and hang out to dry in a shady place. The skins, if dry, should be soaked in water before tanning.

MANURES, FROM THE VINEGROWER'S POINT OF VIEW.

Paper read before the S.A. Vinegrowers' Association on March 24, 1899, by Arthur J. Perkins, Government Viticulturist.

Gentlemen—

The invitation conveyed to me by your President to read a paper on the practice of manuring in its relation to vines, carried with it, so far as I was personally concerned, a twofold pleasure. First, it afforded me the opportunity of dealing with a subject that has at all times had great attractions for me; and second, it proved to me that the success that has but recently crowned the vigorous efforts of my colleague, Professor Lowrie, who, after more than ten years' stumping the country, backed up by constant yearly object lessons at Roseworthy, has finally succeeded in awakening from their torpor our conservative wheatgrowers, that his success has struck some sympathetic chord in the vine-growing world. If in wheat and hay growing manures have given successful results—and by successful results we have, of course, solely in view pecuniary gains—why should they not prove of equal value amongst our vines? Such, I take it, under the influence of passing events, is the form that in the minds of the majority this important question is most likely to assume. A question simple in appearance, the discussion of which, however, must perforce involve us in a multitude of important side issues that I can only hope to present to you in briefest outline. Should my statement of the case not fail in clearness and conciseness, I must, in view of the great disparity in the importance of the subject matter and the time left for its discussion, crave your indulgence for other shortcomings.

And here, on the threshold, it behoves us to pause and consider whether, after all, the two cases—wheat and hay growing on the one side, vine-growing on the other—whether the two cases are exactly parallel; and if not, wherein lie the material differences, and to what extent are they likely to modify final results. The origin and root of all differences that may arise is to be attributed to the difference of longevity in the two plants; wheat, after all, is but an annual herb, the vine a perennial shrub. The former, though under favorable conditions it may during its short span of life develop strong and well-grown roots, must, when compared with the latter, be ranked amongst shallow-rooted plants; the former finds mainly in the soil its substance, the latter in the subsoil. And further, with wheat and other annuals the fertilising substances are drilled in with the seed, and are therefore from the very beginning in contact with that portion of the root system whose special function it is to absorb the fertilising moisture of the soil. With the vine—and, for the matter of that, with all perennial trees and shrubs—the case wears a totally different aspect; the manure that is spread on the surface is, it is true, in contact with a portion of the root system, but not with those parts that are capable of utilising it—the younger parts that alone carry root hairs. It is possible that to all of you the findings of vegetable physiology, of great importance in our present discussion, may not be equally familiar; I may be pardoned, therefore, a brief and perhaps necessary digression on the subject. The root system of all perennial plants consists of a series of large and more or less branched feelers, extending in search of food symmetrically around them in every direction. It is, however, alone the fine capillary root hairs that are able to perform the important function of actual absorption; and, in consequence of their yearly death and subsequent renewal in the neighborhood of the growing tip, it will be evident that year by year the feeding apparatus wanders further and further away from the plant it supports. It is undeniable, however, that new branches are from time to time thrown out closer up to the mother plant, and that in

consequence some root hairs are always to be found in the relatively superficial layers of the soil; the majority, however, occupy greater depths. It is only heavy rains, therefore, that can bring the fertilising substances within reach of the active portion of the root system.

Again, whilst the object in view will, of course, always ultimately imply an increased yield per acre, with the vine, it is not always evident that recourse to manures will uniformly ensure such results. That heavy yields are not to be looked for from puny weakly plants will generally be conceded; if manures, by strengthening such plants, render them capable of carrying more satisfactory crops, they will have proved of direct benefit. But with good average plants, yielding average crops, have we interest in abnormally increasing their vigor? Is it not an acquired fact that the fruiting of extremely vigorous vines is usually unsatisfactory? Is it not from average vines that the most remunerative crops are generally gathered? Here again we have an important difference that will have to be taken into account by general practice. Within reason the wheat plant cannot be too strong for the hay crop, and under our average conditions probably not for the grain crop; with the vine excessive vigor might in some cases be followed by diminished returns.

And finally, we are confronted with a question that has frequently been raised in those favored homes of the wines of exceptional quality, the Bordeaux and Burgundy districts for instance. Is it, under any conditions, independently of increased yields, at all advisable to tamper with the natural composition of the soil? Manures, it is said here, by enriching the soil tend to reduce the quality of the wine, and undoubtedly as a piece of abstract reasoning there is much to be said in favor of their argument. The general experience of centuries proves very definitely that wines of quality are gathered, not from fertile plains, but from poor hill slopes. Heavy dressings of fertilising substances, so long as their action lasts, temporarily transform the poorer soil into one of unusual richness; and may we not, it is added, arguing from analogy, infer that as the growth of the plants so the quality of the wine will be profoundly modified? May we not expect from our good hill country the inferior plain type of wine? This may or may not be true—personally I shrewdly suspect that the quality of wines is to a greater extent dependent on local climate and the physical condition of the soil than on the relative richness in nitrogen, phosphoric acid, and potassium oxide. In any case the subject is too delicate and complicated to admit of *a priori* reasoning, or inferences from analogy; a long series of experiments that it has not, nor is it likely to receive, could alone yield a satisfactory solution; and meanwhile the question must lie in abeyance. So far as we are concerned, however, all difficulties on this score may be settled very summarily. The world offers but few places for high priced high-class wines, and these are all occupied. Of the occupants, it may be said, many are well worthy of their position; others, and their name if not legion is at all events scores, are maintained there by custom and the human practice of blindly following a leader. Some few of our wines are probably worthy of taking an honored place amongst them, but many generations will speed by ere they can gain admittance to the charmed circle. But the great bulk of them, what are they but good average bulk wines for which we claim little quality and moderate prices, and on which the relative fertility of the soil, natural or artificial, can have but moderate influence? Any doubts, therefore, that we may have had on the subject may be relegated to oblivion; and for us be it said, once and for all, the advisability of adopting the practice of manuring will be solely dependent on the likelihood of its ensuring us increased yields at low rates of expenditure. On what it may do for us and the likelihood of its adoption here I will dwell in the closing parts of this paper.

So much for the difference in practice that must arise, and on which it may occur to you that I have dwelt at unnecessary length. In view, however, of

the fact that on the minds of most of you the practice of manuring as applied to annuals must have become more or less stereotyped, it was imperative from the first to carefully define the spirit in which the subject had to be approached when dealt with in connection with a perennial shrub like the vine.

As the animal kingdom, either directly or indirectly, is dependent on plants for its food, so the latter derive their nourishment from the soil; and this practice of manuring, implying as it does the enrichment of the soil in plant food, would seem to suggest the possibility of the complete exhaustion of the latter, under the effects of cultivation. And yet such is very far from being the case, as witness those lands that can boast of a civilisation of great antiquity, and where thousands of years of cultivation have not yet rendered vain the efforts of a primitive and defective agriculture. It must be admitted that in the soil plants have what has proved to be an inexhaustible storehouse of food, and that, practically, what is removed by one generation is in time accidentally restored by another. Under conditions of nature the relative yields of soils would gradually settle down to a sort of dead level, varying simply with the special nature of the soil, and other secondary factors influencing growth. When once land enters under cultivation, a disturbing factor is brought to bear upon the equilibrium of nature. The scanty supplies of uncultivated lands do not satisfy us, and we force the land to yield its utmost by crowding over its surface an unnaturally large number of plants. Now, though cultivation may not completely exhaust a soil in the sense of doing away with its store of fertilising elements, it certainly tends to reduce its fertility, so that in time soils once yielding heavy crops are liable to settle down to returns that may not even equal those of untilled lands. In connection with our subject, a clear understanding as to the meaning to be attached to the word "fertility" is necessary. In common parlance we understand thereby the measure of the present capabilities of the soil; for this fertility is exhaustible, though not the original stock that engenders it. This property of a soil is not dependent on the actual amount of foodstuffs present in it, but on the amount that, at a given moment, is available to plants. This available stock nature is slowly but steadily accumulating in soils that are not under cultivation. In the vegetable mould deposited in forest and scrub land lie mines of riches for future generations, and, though to a lesser degree, the same may be said of any good untilled land. Place them under cultivation, and the savings of centuries are rapidly dissipated, and all our most approved tillage practices, tending to hasten the slow processes of nature, cannot materially improve the yields. Arrived at this stage, with the desire to succeed in this age of keen competition, but two alternatives face us—rest and quiet, or the use of manures.

Our modern practices of manuring are supposed to be based—first, on a knowledge of the requirements of plants, and second, on the knowledge of the deficiencies of the land in which they may be placed. I say "supposed," because, so imperfect is the present state of our knowledge of the intimate relations existing between plants and their substratum, that the above data can only be looked upon as useful guides to direct experiments on which alone can rest the final details of practice. The requirements of the plant are ascertained by direct chemical analysis of the plant, and the deficiencies by an analysis of the soil. As some knowledge of both these points is extremely useful in ordinary practice, it is as well for us to inquire into what may be learned on the subject; and first, in regard to the requirements of the vine. Very important results on the subject, the fruit of laborious and exhaustive experiments, have of late years been given to the world by that eminent chemist of the Paris Agronomical Institute, M. A. Muntz. I have neither time nor inclination to give a detailed account of his experiments. It is the results alone that at present interest us. It is sufficient to know that they are derived from work of unimpeachable

accuracy, and that they place before us a reliable statement of the case. Strictly speaking, for greater accuracy, it were perhaps better could our calculations be based on local experiments. Failing these—and they are of such magnitude as to place them beyond our reach for some time to come at all events—failing these, we must perforce fall back upon the best available. Muntz's experiments, it may here be stated, were conducted over a large number of vineyards, situated in all the different French wine districts, and covering, therefore, a great variety of soils and climates; but, as will be seen in the sequel, such differences affected but little the final results.

It will be almost unnecessary to point out that, of the substances absorbed by the roots of plants, nitrogen, phosphoric acid, and potassium oxide are the only ones that need occupy us in our present inquiry. In Table I., compiled from Muntz's results, will be found expressed in pounds avoirdupois the amount of each one of these substances taken up yearly by an acre of vines in three different wine districts of France.

TABLE I.

	Average yield of Wine.	Nitrogen.	Phosphoric Acid	Potassium Oxide.
	Gallons.	lbs.	lbs.	lbs.
South of France.	1,021	46.64	11.44	38.75
Medoc	234	38.75	13.50	51.92
Champagne	220	41.36	9.68	44.88
Average	—	42.25	11.54	48.58

The most striking feature in Table I. is, I think, the relatively small differences in the absorption of fertilising substances by plants grown in the different districts, in spite of enormous differences of yield. This fact, as intimated above, permits us to infer that, in all probability, figures collected here would differ but slightly from the above. Further, it will be noticed that, whilst in the heavy yielding districts of the south of France nitrogen is the predominating element absorbed, in the districts with more modest yields potassium oxide takes the precedence. This may either be due to climatic influences that accumulate greater quantity of the latter substance in leaves of colder districts, or else to the peculiar requirements of special varieties. And finally, the relatively modest demands of the vine for phosphoric acid should be noted. This fact will assume some prominence if Table I. is compared with Table II., in which are shown the requirements of some other cultivated plants.

TABLE II.

	Crop.	Nitrogen.	Phosphoric Acid.	Potassium Oxide.
	Bushels.	lbs.	lbs.	lbs.
Wheat	16	34	14	16
Wheat	44	82	34	43
Barley	28	34	15	30
Oats	28	28	11	22
Maize	28	34	15	35
	Tons.			
Turnips	10	84	41	97
Potatoes	7	69	32	100

A rough idea of the gross amount of fertilising substances annually abstracted from the soil is not always sufficient; some knowledge as to their distribution over the different parts of the plant is frequently of equal, if not greater

importance. Below will be found in tabular form (Table III.) the average distribution of these fertilising substances over wine, lees, marc, leaves, and shoots.

TABLE III.

	South of France.			Medoc.			Champagne.		
	Nitrogen.	Phosphoric Acid.	Potassium Oxide.	Nitrogen.	Phosphoric Acid.	Potassium Oxide.	Nitrogen.	Phosphoric Acid.	Potassium Oxide.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Wine	3	2	10	1	1	4	1	1	3
Lees	0.9	0.3	2	0.3	0.1	2	0.1	0.04	0.4
Marc	11	4	8	4	1	5	4	2	5
Leaves	26	4	12	25	7	22	26	5	23
Shoots	5	2	9	8	4	14	6	2	10

I would recommend a careful examination of Table III., for from it may be derived conclusions of extreme importance to the vinegrower. From its figures may be seen that, in spite of the relatively large amount of fertilising substances absorbed by the vine, only from 10 per cent. to 15 per cent. of them—those found in the wine—need actually be removed from the vineyard. The lees and marc can of course be returned in their entirety; of the leaves it may be said that some stay at home, whilst others go to fertilise the neighbors' paddocks; and finally, by burning the cuttings and spreading the ashes over the vineyard we return all their mineral constituents, if not the nitrogen.

Such facts would almost make us question the necessity or even the wisdom of having recourse to heavy dressings of manure; and yet the long experience of other countries is there to prove that in order to ensure regular heavy yields of a liquid relatively poor in fertilising substances, it is practically necessary to waste on the vegetative organs of the plant disproportionately large quantities of the latter. In fact, it is my opinion that if we are ever to notably increase our average yields we shall be obliged, in average soils, to annually restore *in toto* the sum of fertilising substances drawn from the soil.

That the chemical analysis of the soil can yield information that has its importance for those who are about to put to the test the practice that we have under consideration, has already been pointed out. To those, however, who would appreciate the full value of the findings of the analysis, a correct knowledge of the proportions in which the different fertilising substances are found in ordinary soils is absolutely necessary. This matter I propose therefore to briefly review here, referring at the same time to the state of combination, of solubility or insolubility, in which these substances are generally to be found.

Nitrogen appears in the soil under three different forms; it is contained in nitrates, in ammonium salts, and in organic matter. Under the first two forms it is directly available to plants; under the last it has first to undergo complex chemical changes known as *nitrification* before it can be absorbed by plants. The process of nitrification advances with greater or less speed according to the nature of soils and the conditions that may surround them; it is rapid in open, light, and well-drained soils; slow in heavy, water-logged, or marshy soils. It follows, therefore, that whereas there is an accumulation of nitrogen in the latter, the former rarely contain more than an average quantity, and frequently less. So long, however, as natural conditions remain unchanged, this over abundance of nitrogen is of little use to plant life; and such soils, intrinsically rich in reality, are frequently barren in their results. They are

amenable to improvement, and rational methods of cultivation will readily convert them into soils of extreme fertility; such is the effect of good tillage, under drainage, dressings of lime, &c., all of which activate or render possible the nitrification of the otherwise useless organic matter. Nitrogen, which in combination as nitrates or ammonium salts becomes directly available as plant food, is, according to the power of absorption of the soil, either absorbed by the surface roots or else it finds its way in solution in rainwater to the sub-soil, where, by deep rooted plants like the vine, it is probably in greater part absorbed and brought back to the surface in the form of new plant growth.

The total amount of nitrogen present in agricultural soils is subject to considerable variations. In a good average soil the proportion usually approximates .1 per cent., whilst poor soils frequently contain less than .01 per cent., rich soils about .2 per cent., and marshy soils in which nitrification is partially or completely arrested, as much as 1 per cent. and 1.5 per cent. The greater part of this nitrogen is in the form of organic matter, only a small proportion of which, from 2 per cent. to 3 per cent., annually undergoes nitrification and becomes available as plant food. When in an average soil the proportion of nitrified nitrogen attains to $2\frac{1}{2}$ per cent. of the total amount present it is reckoned to have reached the normal mean, and to maintain the soil in a suitable state of fertility. Excessive nitrification would imply waste and premature exhaustion, whilst anything below the normal mean would usually be followed by comparative sterility. Given the average amount of .1 of nitrogen in a soil, the normal nitrification of $2\frac{1}{2}$ per cent. would, over the depth of a foot of soil, represent the annual manufacture of 88lbs. per acre of nitrogen in the form of nitrates—a quantity, allowing even for losses, more than sufficient for the requirements of the vine.

In the present state of knowledge it is not easy to ascertain in what state or form the phosphoric acid of the soil can be looked upon as directly available or not to plants. In estimating therefore the relative richness or poverty of a soil in this substance, we can only take into account the total amount present, independently of its state of availableness. A soil in which the proportion does not attain .05 per cent. must be looked upon as poor. An average soil will contain from .05 per cent. to .1 per cent., while rich soils contain from .1 per cent. to .2 per cent.

As to the action of the roots of plants on the various combinations under which potassium oxide is found in the soil, what has been said of phosphoric acid may be repeated here. It is usually allowed, however, that that found as an integral part of organic matter, and that in all combinations soluble in water, can be directly absorbed by plants, whilst in its other more resistant forms, such as silicates, &c., it is only gradual weathering and slow chemical changes that can at all render it available. A good average soil should contain from .1 per cent. to .15 per cent. of this substance, anything below must be looked upon as insufficient for the ordinary requirements of plants; whilst rich felspathic soils frequently contain as much as .5 per cent., the greater quantity of which, however, is in hard rocky combinations, only becoming available by the slow action of weathering.

Such then, in so far at all events as our subject is concerned, are the proportions and forms under which these three substances, nitrogen, phosphoric acid, and potassium acid are found in the soil. And now a word on the powers of absorption of soils here becomes necessary. When considered in connection with plant growth, these powers of absorption become vested with considerable importance; on them after all ultimately depends the fertility of the soil, and were it not for their possession to a greater or lesser degree by all soils, vigorous plant growth would be practically impossible. These substances necessary to plant life, and that we sometimes bring to them in the form of manures, are

found, as has been repeatedly stated, in forms that are either immediately available, or else gradually become so. In forms that are available they are usually readily soluble in water, or in weak acid solutions, and it is in such solutions that they find their way into the tissues of plants; were it not, however, for the powers of retention and absorption of soils, rainwater, and particularly so in wet districts, would soon wash away the soluble available plant food beyond the reach of roots of average plants. All soils, however, are endowed to a greater or lesser degree with the property of retaining and absorbing these soluble substances, holding them, so to speak, in trust for the plants. It is not to the soil as a whole that these valuable properties belong, but to two of its main constituents, clay and humus or organic matter; from which may be derived the fact that soils poor or deficient in these two important substances, such as the majority of light sandy lands, lose proportionately their powers of retention and absorption. Ammonium and potassium salts in the form of carbonates are very firmly retained in the surface soil; so that in drainage waters they rarely appear in notable quantities; the same may be said of the soluble phosphates that enter into temporary combination with iron and alumina, but not, unfortunately, of the all-important nitrates. Of the latter may be said, whatever their state of combination, what part of them is not immediately absorbed by plants passes into the depths of the subsoil; and here it may be consoling to reflect that, as has already been intimated, in general it will not be altogether beyond the reach of a deep rooted plant like the vine. The importance of these brief remarks, and their bearing on the direct application of manures, will, I hope, soon become apparent.

What interests the soil, in the practice of manuring, may be completed by a brief reference to the adaptation of the different kinds of manures in use to the types of soil of most common occurrence.

Light Sandy Soils.—Such soils are usually deficient in organic matter, and benefit both in their chemical composition and physical condition by dressings of manures rich in organic matter, such as farmyard manure. These soils are usually open and well aerated, and therefore the seat of very active nitrification. Organic matter shows therefore a tendency to waste, and light annual dressings are to be preferred to heavy dressings at longer intervals. Similarly, cold slowly decomposing manures, such as cow and pig manure, should receive the preference over heating and rapidly decomposing manure, such as horse and sheep manure. The latter present not only the objection of frequently decomposing more rapidly than is expedient, but in their rapid fermentation they heat the soil and dissipate its scanty moisture. Nitrates should be applied sparingly in yearly dressings. The same may be said of ammonium salts, that these soils retain but feebly. Owing to poverty in organic matter and alkaline salts, phosphates should usually be preferably applied in such soils as superphosphates. These soils are frequently deficient in potassium oxide, and benefit by dressings of manures containing the same.

Heavy Argillaceous Soils.—These soils adapt themselves well to heavy dressing of manure applied at relatively long intervals. Their decomposition is slow, and the soluble products of decomposition are very firmly retained by the clay present in large quantities. Heavy dressings of organic manures give good results, more especially when some modification of its natural capacity is desired. Nitrification is slow here, and, in consequence, it is not advisable to bury the manures at too great a depth, not more than 2½ in. Nitrates again to be applied in light annual dressings. Ammonium salts may be used at heavier rates. Insoluble basic phosphates may take the place of superphosphates, unless immediate results are required. Such soils are usually rich in potassium salts, so that any further addition of them in the form of manures is generally

unnecessary. These potassium salts are, however, frequently firmly retained by the soils in the form of carbonates. A good dressing of gypsum, by transforming them into sulphates, facilitates their diffusion through the soil.

Good Average Soils.—To such soils well rotted farmyard manure adapts itself well; preference should, however, be given to nitrates and ammonium salts when immediate results are required. On the same principle, according to requirements, either tri-basic phosphates or superphosphates may be used.

Soils of Purely Limestone Formation.—Such soils, owing to active nitrification, being always poor in organic matter, benefit more by dressings of farmyard manure than by the addition of nitrates or ammonium salts. Here potassium oxide is usually present in but small quantities; potassic manures may therefore be recommended in small annual dressings. Superphosphates should always receive the preference over bonedust or other tri-basic phosphates.

Acid Marshy Soils.—Heavy dressings of lime are necessary in order to render nitrification possible; nitrogenous manures of any sort are usually uncalled for. Such soils are frequently leached of their potassium salts when the use of potassic manures becomes advisable. Phosphates in the tri-basic state yield excellent results.

What is the special individual influence of each one of these substances, nitrogen, phosphoric acid, and potassium oxide, taken separately, on the growth and fructification of the vine, may now become the object of brief inquiry.

Nitrogen is usually the principal factor for growth, and soils rich in available nitrogen are in general characterised by vines of great vigor. Similarly, the direct action of nitrogenous manures may be described as strengthening and invigorating the plants, their indirect action as rendering them capable of heavier fruit bearing. In those localities where the heaviness of the crop is the principal consideration, of all fertilising matters nitrogen will be taken up by the vine in greatest quantities; and it follows that, unless the soil is unusually rich in this substance, dressings of nitrogenous manures become imperative. They may further be recommended whenever vines have suffered from disease, drought, or any other accidental cause. These manures should, however, be avoided whenever, through excessive vigor, there is danger of an unsatisfactory setting of the fruit.

Of phosphoric acid the exact action on vines has not definitely been determined. Without any very accurate experiments in support, it has been stated that this substance favors the setting of the fruit and the ripening of the wood. Be that as it may, its action in conjunction with nitrogen on general growth cannot be denied; though in this line it by no means attains to the importance of the latter. Its tentative use in ordinary dressings may be recommended in most soils.

The greater part of the potassium oxide absorbed by vines is concentrated in the fruit, and this substance has come to be considered as the factor *par excellence* for fruit. By many, however, its value as a manure has been overrated. In some soils, and under some conditions that have not been satisfactorily determined, it gives excellent results, so far as increase in the yield is concerned, whilst in others it remains absolutely without effect. The abundance with which it is found in the fruit renders it advisable to test its value by direct experiments in almost every case.

Did this paper make pretence to be anything more than a rough outline of an important question it would here be necessary, for completeness sake, to pass in review the various manures on the market. Time, however, does not allow of our entering on the discussion of a matter that otherwise would not be without its interest. It must therefore perforce be taken for granted that these different manures and their composition are all familiar to you; and it will be agreed, in view of the regulations in force concerning their sale, such

an assumption might readily be justified. It remains for us therefore to briefly consider in what proportions and in what manner it is advisable that the different dressings be applied. By taking the average of Muntz's numerous analyses, and after making some allowance for losses that are likely to occur in the soil, we are able to estimate the yearly requirements of the vine at the following figures:—Nitrogen, 55lbs. per acre; phosphoric acid, 15lbs. per acre; potassium oxide, 50lbs. per acre.

Given, therefore, an average soil, the fertility of which we desired to maintain, it would be necessary to dress it annually with a complete manure containing the different fertilising substances in the above proportions. I append a few model dressings calculated to fulfil such requirements:—

(A)
Nitrate of soda (at 15 per cent.)..... 3cwt = 55lbs. of nitrogen
Potassium sulphate (50 per cent. potassium ox.), 100lbs. = 50lbs. potassium oxide
Superphosphate (16 per cent.), phosphoric acid, 100lbs. = 16lbs. phosphoric acid

(B)
Sulphate of ammonia (at 20 per cent.)..... 2½cwt. = 55lbs. nitrogen
Potassium sulphate (50 per cent.) 100lbs. = 50lbs. potassium oxide
Superphosphate (16 per cent.)..... 100lbs. = 16lbs. phosphoric acid

Such dressings might be alternated with dressings of organic manures, such as farmyard manure, grape skins, &c. Farmyard manure is usually used at the rate of ten tons per acre for three years, and, as will be seen below, its average composition at the above rate approaches the requirements of the vine during three years.

Ten tons of Farmyard Manure.
Nitrogen..... 145lbs.
Phosphoric acid..... 12½lbs.
Potassium oxide 168lbs.

Absorbed by Vines in three years.
Nitrogen..... 165lbs.
Phosphoric acid..... 45lbs.
Potassium oxide 150lbs.

The above figures show an excess of phosphoric acid. This substance might therefore be omitted when recourse was had to the alternative dressings of artificial manures. Eight tons of grape skins would similarly answer to the requirements of an acre of vines during three years. They would contain approximately:—Nitrogen, 180lbs; phosphoric acid, 60lbs.; potassium oxide, 90lbs.

Here again we have a slight excess of phosphoric acid and a marked deficiency of potassium oxide. Both deficiency and excess can readily be corrected, if necessary, in subsequent dressings with artificial manures.

Any further multiplication of examples is altogether unnecessary. From the results of the chemical analysis of manures one may intend using, and the figures indicating the requirements of the vine, dressings suitable to average cases may always be derived.

To seat every-day practices on a solid basis of facts and rational deductions is the general endeavor of scientific research, and that in a measure we have been able to rescue the practice of manuring from the domain of empiricism is largely due to its untiring efforts. To imagine, however, that the last word has been said on the subject, or to overlook the fact that this important practice is still involved in much that is obscure and ill understood, would be contrary to the best traditions of experimental science. The practice of manuring has not yet, if it ever will, acquired the exactitude of mathematical science. The figures concerning it that we have been able to give, without making any pretension to definiteness, or even to exact application in a few individual cases, will always serve to broaden our views on the matter, and enable us to approach our work in a spirit of intelligent understanding. It cannot, therefore, be too often repeated that in the present state of our knowledge, if we are to make the most of this practice of manuring, its general application must, in every separate case, be preceded by individual local experiments. In other terms, the results of scientific

research are able to indicate what, under average conditions, would most probably prove correct practice ; but it is the soil and local conditions alone that can place the practice of individual cases within the limits of absolute certainty ; interrogate them, therefore, by local experiments. It is on the method of carrying out these experiments that I now propose detaining you for a few moments.

In the first place it is necessary to note that the different plots should be characterised by great evenness, both as regards the nature of the soil and the nature of the varieties and the strength of growth of the vines it carries ; they should further represent a fair average of the vineyard to which they correspond. The number of these experimental plots will, of course, vary with circumstances ; in general, however, it will not be advisable to reduce them below four, arranged on the following lines :—

A. Complete manure containing suitable proportions of nitrogen, phosphoric acid and potassium oxide.

B. Manure containing only nitrogen and phosphoric acid.

C. Manure containing only nitrogen and potassium oxide.

D. Unmanured.

Circumstances may occasionally render it necessary to augment the number of the plots, when some of the following might be added :—

E. Farmyard manure.

F. Grape skins.

G. Manure containing nitrogen, and phosphoric acid, accompanied by a dressing of gypsum (3cwts. to 4cwts.).

H. Gypsum alone (3cwts. to 6cwts.).

In the above we have indications as to the kinds of plots that might be adopted ; to local requirements we must, of course, leave the task of suggesting their multiplication, reduction, or variation. It may be pointed out, however, that the value of the various manures containing the fertilising ingredients might be submitted to comparative tests. Thus bonedust might be tested against superphosphates ; nitrate of soda against sulphate of ammonia ; potassium sulphate against potassium chloride or wood ashes, &c. And finally the quantities necessary of each separate manure might be accurately ascertained by a graduated series of plots.

The undertaking of experiments is well enough, but it is on the care and attention that is bestowed on them, and on the accuracy of the interpretation of their results, that their value depends. Slipshod experiments are absolutely valueless, mere waste of money. Those who would make more than a pretence at such work must breathe that enthusiasm that makes them a labor of love. The treatment of all blocks must be uniform, tillage and all other cultural details irreproachable, all accidents tending to affect final results must as much as is possible be foreseen and warded off. Neither is the correct interpretation of results any ordinary matter. It frequently calls into play an acumen and power of inference denied to some, and above all it implies an impartial open mind, unfettered by preconceived ideas. The ultimate test is, of course, in the end purely a matter of accounts ; whether a plot manured with such and such a quantity of such and such a manure yields over the unmanured plot a sufficiently high excess of fruit to leave an appreciable balance of profit. Accurate accounts of expenditure and receipts must therefore be carefully kept ; the cost of the manure ; the cost of its application ; the yield of each separate plot must be carefully ascertained by direct weighing, and not by rough eye estimation. And finally, some account must be taken of the increase in vigor of the plants, and their consequent capability of bearing heavier crops in incoming years. Scrupulous exactitude would imply the separate weighing of the cuttings of each block, but for ordinary purposes the eye of the unbiassed and experienced grower would prove sufficient. Careful

note must be kept of meteorological accidents affecting either the growth or the fruit-bearing of the plants, such as hail, frost, hot winds, &c., and in every case an accurate estimate should be made of the damage, if appreciable.

The length of the term over which such experiments are made to last has also its importance. Experiments limited to one year would be of little value. A dry season might readily deprive results of much of their significance; the effect of the manures may not in the first year be evinced by heavier fruiting but by healthier growth, the forerunner of better crops; and from all points of view three years must be looked upon as the minimum over which such experiments can be allowed to extend.

Such experiments would be robbed of much of their value were they confined to too small an area. Flowerpot experiments we have in abundance; they may teach us lessons in vegetable physiology, but would be out of place in our present concern. The yield of an acre cannot be determined from the returns of one or two vines. I would much prefer to see the different plots an acre in extent, but recognise that in all probability equally reliable results might be obtained from a quarter of an acre. I would not, however, advise reducing their area below this fraction.

To complete our study of this question there yet remain to be considered two more points of some importance; the proper time of the year to apply these manures and their methods of application. In respect to the time of application European practice separates manures into two different classes; first, bulky organic manures of slow decomposition, such as farmyard manure, bonedust, grape skins, &c.; second, concentrated manures readily soluble in water, and therefore liable to pass into the subsoil if not absorbed by the plants. The former are incorporated with the soil at the earliest opportunity, that is to say, generally immediately after pruning and before the first ploughing; the latter are spread over the soil either before or after the second ploughing, and at all events immediately before the bursting of the buds. Under the conditions prevailing in Europe such a practice is rational, and in those districts favored with heavy spring rains its adoption may still be recommended here. In our drier districts, and one might almost say in most of our districts, no such distinction between the different kinds of manures is possible. I have applied soluble manures in August and only benefited by their application the following year. In my opinion—and it is the result of some years' local experience—in most of our districts, all manures, whether readily soluble or of slow decomposition, should be applied as early as possible, never later than June, to be followed immediately by the first ploughing. Tardy dressings will only tell the following season in the majority of cases.

An examination of the practices of other countries reveals to us the existence of three different methods of applying the dressings:—1. They may be placed in little basins opened out around each vine. 2. They may be simply thrown in the middle of the rows. 3. They may be spread uniformly over the whole surface.

In a vineyard of full-grown vines the last practice alone can be recommended for general use. Given that the roots occupy the whole of the available space of soil placed within the reach of the whole root system, the manure has a better chance of being completely absorbed than if it comes in contact with one portion alone. For young vines, however, the roots of which have not yet had time to take their full development, the practice of digging in the manure within 18 in. of the stem should receive the preference.

As to the actual practice of spreading, it will, of course, vary with the nature of the manure that is used. Farmyard, and other bulky manures of like nature, will be conveyed in wagons or drays, and spread with forks. Those known here as artificial manures, manures that are generally more concentrated and in a fine

state of division, can either be hand sown or applied with a broadcast manure-distributor. For our purposes the drill must generally be looked upon as out of place, in fact, impossible to use where the dressings are applied before the first ploughing. Where they are made to follow this operation, or are applied when the soil is loose and open, in virtue of the fact that it ensures the immediate burial of the manure within the soil, it may have its advantages in the case of manures subject to rapid decomposition and subsequent volatilisation, such as sulphate of ammonia. All bulky manures will, of course, be ploughed in, whatever be the time of their application. The same practice will prevail when artificial manures are applied before the first ploughing; if at a later date, they may be either scarified or harrowed in. In view of the always possible scarcity of spring rains, the more advanced the season the shallower should be the depth of their burying.

And now, gentlemen, that the hour of your release looms in view, it remains for me but to express the hope that my efforts at portraying a rough bird's-eye view of the most important issues involved in the general practice of the use of manures in the vineyard may not have overtaxed your patience. We have had occasion to refer to experiments, and I feel that by inflicting upon you a paper of unusual length I have perhaps myself been trying my 'prentice hand in a somewhat risky experiment. The importance of the subject-matter cannot, however, in my opinion be overrated; and, much as I am alive to the scanty justice I have been able to do it, I feel certain that should I have been successful in conveying to your minds something that is new—should I have been successful in inducing you on your sides to enter temporarily into the land of experiments—I feel certain that you will cast a lenient eye over a paper that, after all, has had to be rapidly compiled in the spare moments of a fairly busy life.

CONSERVATION OF THE RAINFALL IN HILLSIDE VINEYARDS.

BY THOMAS HARDY.

The extremely short crop of grapes on all the hillside vineyards south of Adelaide has set me thinking on the cause or causes of such shortage. One of the principal causes is the non-setting of the Mataro, most probably due to a spell of very cold rough winds at the time of flowering. This seems to be proved by the fact that the Grenache vines growing adjacent, or even among the Mataros, have a good crop of grapes on them. Another cause was the severe hailstorms, which affected all kinds alike.

I am inclined to think, however, that the principal cause is the absence of moisture in the subsoil, due to the deficient rainfall of the last two winters. The very short growth of wood made by the vines on hillsides seems to point to this as the cause.

The question to be considered is whether we do all that might be done to conserve and utilise the rainfall in such situations. In countries where the rainfall is about equal to ours, great care and labor are devoted to drawing away the earth from the vines as soon as the crop is gathered, forming a basin around each vine. In Sicily, I am informed, this is very generally done, and with the best results. This is done to catch the water which would otherwise run off the land. Of course, this process would hardly be practicable in our large vineyards, but much may, I think, be done by opening up a fairly deep double furrow between each row of vines as soon as the grapes are gathered, provided the rows are planted nearly on a level round the hillsides, as they are at Tintara; the furrows following the contour of the hill.

The objection raised to this plan is that in a very heavy rainfall the water collecting in these furrows would break away in places and wash away much soil. Experience alone will prove if this is a serious objection or not; at any rate we shall try it in some of our hillside vineyards this season. The furrows so made will not be in the way of further cultivation, where, as is now the general plan of ploughing the vineyards twice each season, the first time away from the vines; in fact it would be an advantage in thoroughly moving the soil to a good depth midway between the rows, making the second ploughing much more complete and easy; even if it broke up a few roots little harm would be done to the vines. I trust that some of our enterprising young vinegrowers will give it a trial this coming season.

THE BEEHIVE.

NOTES AND HINTS FOR APRIL.

BY APIS LIGUSTICUS.

The honey season is now drawing to a close, and the aim should be to get the bees into a restful condition in anticipation of winter. In opening hives great care should be exercised in order to prevent robbing. The work of removing section boxes or taking out frames of honeycomb for the extractor, should only be done early in the morning or in the evening. At this section the best time for all work amongst the hives is in the evening. In preparing bees for winter the first thing to do is to remove all surplus frames, and crowd the bees on to as few combs as they can conveniently cover. About six standard Langstroth frames are sufficient in each hive. Cover the frames with a piece of unbleached calico or bagging, and lay over that one or two thicknesses of old carpet, or any other porous material that is at hand. The cap or cover should then be put on the hive, and the entrance opened to a width of about 6in. It is very important to have a good wide entrance to the hives in winter, as by this means mildew is prevented from forming on the combs. A good watertight roof is indispensable in winter. With flat-topped hives, a piece of galvanized corrugated iron 2ft. 6in. x 2ft., held down by a heavy stone, makes a very good roof. Each colony of bees should have quite twenty pounds of sealed honey when arranged for winter. Any deficiency in this respect should be made up by combs from such colonies as can spare them. If any hives are found to be queenless, such hives should be joined to others that have queens. In doing this the colony having a queen should be well smoked with tobacco smoke, and the queenless bees allowed to run in at the entrance. The best time for this work is at dusk in the evening. Wax moths will now be seen flying about the hives trying to gain access to the combs on which to lay her eggs. Where the hives are populous the bees guarding the entrances will not allow a single moth to pass, but weak colonies or foul broody hives will quickly be destroyed. If the wax moth is permitted to lay her eggs in a comb the little grubs will soon appear, and if suffered to remain they worm their way through the comb, constructing a silky tunnel as they proceed. The grubs of this moth are quickly killed by fumigating the combs with burning sulphur.

Several close observers have this season noticed a small parasite on queen bees, especially those of the Italian race. This parasite is named *Braula cœca*, and although it does not appear to do any mischief to the queens, it is well to remove it if possible. Mr. Cheshire in his excellent work on "Bees and Beekeeping," thus describes the pest:—"It is a small reddish-brown wingless louse, being about $\frac{1}{4}$ in. long. It is most generally found on

imported bees, and rarely survives a winter in Britain. I have removed twelve braulae from one queen, and, strangely, if a very few only exist in the colony, the queen carries them, they, at least, seeming to believe in 'royal blood,' which they secure by means of a jawed sucker. They are exceedingly difficult to dislodge, as their movements are rapid, and as their bodies, furnished with beautiful hairs, are flattish, while their unique feet, each carrying two toothed combs, give them a secure hold of the webbed hairs of the bee. Touching them with a small brush pointed with thick honey will generally lift them from their place."

POULTRY NOTES.

Written for the "Journal of Agriculture and Industry."

By D. F. LAURIE.

I am very pleased to note that a few crates of poultry are being forwarded to England. If the birds are of the proper ages and description, remunerative prices will result. The Board of Exports in Sydney is doing a good export trade. The expert, Mr. G. Bradshaw, attends numerous country shows and loses no chance of bringing the importance of poultry culture before the producer. Victoria is doing very little, although a few years ago a great stir was made. The following figures indicate that the position in New South Wales is due to the action of the Board:—

In 1897 Victoria exported 5,710 head of poultry and 14,480 doz. eggs. In 1898 the figures fell to 2,127 head of poultry and 7,100 doz. eggs. In 1897 New South Wales shipped 5,910 head of poultry and 192,628 doz. eggs. In 1898 she shipped 16,753 head of poultry and 261,660 doz. eggs. Writing on the subject Mr. Bradshaw says, "Regarding the export trade, it is most satisfactory. There are six men plucking fowls daily, and the best of it is that the same people who exported the first lots through us continue to do so; hence, we expect it pays them; and for the quality, Messrs Brooke, of London, think so much of it that they have sent a man out specially to look after the business. He offers 2s. 6d to 3s. advance on all fowls or ducks which go through, and will accept no other."

I have on various occasions referred to one of the firm, Mr. C. E. Brooke, a Past Master of the London Poulter's Guild; who has done a great amount of good in England with regard to the poultry industry there. The following figures give an idea of the imports of poultry into England:—Eggs—in 1897, £4,356,807; in 1898, £4,456,123. or an increase of £99,316. Poultry and game—in 1897, £730,725; in 1898, £636,488, showing a decrease of £94,237. The total bill, however, was increased by £5,079.

Too many people are apt to underrate the value of poultry. The old idea still survives that it costs a bushel of wheat to produce an egg. Given a fair number of good layers, with good food and attention, and the results will be excellent. I have had numerous inquiries recently, and soon hope to see people, who now pay little attention to the matter, making money from eggs and poultry. The chief difficulty is the desire of many people to stick to the wrong class of birds. It is admitted that laying is a matter of strain, and that a flock of good layers can only be collected by careful selection in breeding. It must, however, be taken into consideration that some birds eat much more than others; this alone is a great consideration where numbers are kept. Again, some breeds do not start laying till seven or eight months old, at a time when pullets of the laying breeds, such as Minorcas, Leghorns, Andalusians, Black Hamburgs, &c., have been laying for two or three months. Some breeds—and notably some hens—lay very small eggs. Such are not desirable, nor is a very large egg. Eggs should be carefully graded for market. Although little attention is paid to this matter here, those who do so, and send the eggs

to market quite fresh, clean, and carefully packed will soon find out that there is a decided preference for those packages. As regards table poultry for the local market, any big plump young bird will do at present. It is, however, worth noticing that any crates of selected birds of quality above the average bring excellent prices. For England the case is different. It seems as if those very coarse crosses, the Brahma-Malay or Malay-Cochin, are the only ones known in the country districts of this colony. These are quite unsuited for export. The Malay is quite out of it for crossing where quality is the point. The Indian Game is now universally recommended for crossing with Dorkings, Houdans, Langshans, Orpingtons, and Wyandottes, as the chicks are all quick growers, not voracious, and are always nice and plump. Breeders should test the value of approved crossbreds as compared with ordinary scrubbers. With the same food the good birds will be ahead all the time. There is far less waste on a good bird; but some scrubbers are almost devoid of flesh, and what there is is by no means appetising in appearance. I strongly advise committees of agricultural societies to strike out numerous classes for purely fancy fowls, and offer encouragement for utility breeds and exhibits of table poultry, both alive and dead. It is far better to offer a few big prizes than a lot of small ones for birds of no value and of breeds of which there are no decent specimens in the colony.

THE AUSTRALIAN WHEAT HARVEST.

The returns from the four principal wheat-producing colonies of Australasia are now complete, showing the yields for the 1898-9 harvest.

According to the *S.A. Register* the South Australian harvest averaged 6bush. 20lbs. per acre on an area of 1,550,000 acres, or a total of 9,816,666bush. The average is $2\frac{1}{2}$ bush. higher than last harvest, and the total over 6,000,000bush. more. It is estimated that after providing for local requirement 175,000 tons of wheat are available for export, of which a large quantity, over 40,000 tons, has already been sent away.

The Victorian returns show an average of 9.41bush., over an area of 2,079,410 acres, or a total of 19,557,532bush., an increase in the average of $3\frac{1}{3}$ bush., and in the total of nearly 9,000,000bush. more than last year.

In New South Wales the average is 7.2bush. over an area of 1,301,000 acres, or a total of 9,232,000bush — the average 3.4bush. and the total 1,338,000bush. less than last season. The yield is considered insufficient for local requirements, but it is stated the deficiency has already been made up by importations from Victoria.

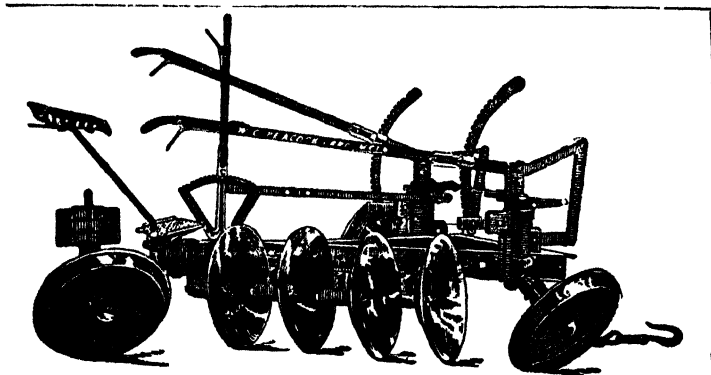
In New Zealand 395,536 acres under wheat averaged 27bush., with a gross production of 10,679,472bush. The average is over 9bush., and the total over 5,000,000bush. beyond the returns of the previous season.

It is estimated that this year the Australasian production of wheat will reach 52,000,000bush., an increase of 50 per cent. on last season, and nearly double that of the previous one.

MR. Luther Burbank, of Santa Rosa, California, the well known introducer of new varieties of fruits, has this year several new plums for which he claims special merit. The Climax and Sultana plums are large, early, highly colored, and of excellent flavor. The Siro is a cross between the Myrobalan and Japanese plums, and is reputed to be very hardy. The Bartlett is reputed to resemble the Bartlett pear in flavor and aroma. In the Pineapple quince Mr. Burbank has a quince which cooks as tender as an apple in a very short time, and possesses a distinct pineapple flavor. The Sugar prune is much larger than the French or Petite D'Agen prune, and fully equal in flavor.

THE SPALDING-ROBBINS DISC PLOUGH.

A good deal of interest has been excited amongst farmers and others by the advent of a new application of the revolving disc for the purpose of ploughing. We have long been acquainted with devices of an allied character for clod-crushing and harrowing, but its use in place of the mould-board plough in turning over the soil is quite recent. In America more than one form of the new disc plough may be found, but in Australia the Spalding-Robbins pattern, manufactured in Melbourne, is the first and only disc plough at present before the public, and has evoked much favorable and a little unfavorable comment from those who have seen it practically at work. It would be an extraordinary thing if no one could find fault with anything, whatever that might be, brought forward, and therefore it will be wise in all farmers and fruitgrowers to suspend unfavorable judgment until they have seen the implement thoroughly tried under all circumstances and conditions. There have been a good many very favorable opinions expressed by farmers of high standing concerning the work done by the Spalding-Robbins disc plough, amongst them being Mr. J. L. Thompson, once manager of Beefacres, South Australia, now Government Travelling Agricultural Instructor, New South Wales; and Mr. George Valder, Principal of Hawkesbury Agricultural College, New South Wales, both of whom speak most enthusiastically about its work.



Made in 2, 3, 4, 5, 6 and 10 Furrow sizes.

These implements are made with discs, numbering from two up to ten, each capable of cutting furrows from 6½ in. to 10 in. wide, and turning the soil to any depth up to 10 in. It is claimed that the use of these implements saves the labor of one-half the number of horses; that it pulverises so completely that one harrowing is saved; that the discs are self-sharpening, therefore saves blacksmiths' bills for laying, sharpening, and renewal of shares and coulters; does not hang up, but rolls over roots, stones, &c., if the disc cannot cut through; can work in hard ground where no ordinary plough can work; will work equally well in soft ground; will turn under stubbles, tussocks, &c.; in fact, it is claimed that these ploughs will do more work, better work, and work where no other ploughs can work, as well as on ordinary good arable lands.

Several demonstrations of the capabilities of the machine have taken place in this colony during the past few weeks, and, as naturally to be expected, considerable difference of opinion exists as to its capabilities. The majority of the farmers themselves seem to be of opinion that for summer work on land clear of stumps, stones, and grass its work leaves nothing to be desired; and

provided it does work of equal quality in the wet and sticky soils it will soon become popular. On March 24 a public trial of a four-disc plough was given at Bordertown at the farm of Mr. W. Montague in the presence of a representative gathering of farmers. The land being of a heavy "crab-hole" nature afforded a splendid test of the capabilities of the plough, and the work done was so satisfactory that the plough used was immediately disposed of and orders for others received. The opinion was freely expressed that the plough would prepare a good seed bed at any time after harvest, even in heavy land of this nature. One of the most frequent objections made is that the price places it beyond the majority of farmers who have already laid out considerable sums on other classes of ploughs.

One of our most practical farmers in the North says, after seeing the plough at work, that there is no doubt it is a decided improvement for clear land, the bottom of the furrow being just as required, no ridge on the inside bottom edge or crust on the bottom, as is the case with the ordinary mould-board ploughs. He considers it of much lighter draught than the latter, and is anxious to see what work it will do in their wet sticky land.

WILL IT PAY TO USE THE HEADER?

By Mr. J. E. ISAACSON, AUBURN.

Whether it is advisable or profitable to head our crops on a large scale I am not prepared to answer, but taking my own crop on its merits the result has been most satisfactory. I put the binder into the crop about a week or ten days before it would have been fit for the stripper and thus secured a good sample of wheat weighing 66lbs. to the bushel, and a useful sheaf of fodder, some of which I sold at 3s. per ton delivered, that being the highest price obtainable for best sheaved wheaten hay at time I sold. The crop in question was a fairly good one, one portion (about twenty acres) going 23bush. per acre, the balance about 17bush. Not having removed the whole of the straw yet I am not in possession of exact figures, but judging from the weight of the portion removed the gross result from straw will be equal to not less than 13bush. of wheat per acre, at the present price, 2s. 3d. per bushel.

One of the great advantages of heading at least a portion of our crop is the fact that we partly secure it as soon as it is bound, as it can lay in stooks in the field fairly safe from the effects of heavy wind, &c., which we know to our sorrow had a very bad effect on standing crops of ripe wheat last harvest. To successfully head a crop of wheat a good deal of care and judgment is necessary. The crop should be an even one, and not less than 2ft. 6in. in height; of course a 4ft. crop is much better to handle and more profitable. The binder should be so adjusted as to tie the sheaf rather closer to the butt than is usual in binding for hay; it should be tied as tight as the string will admit without breaking, so as to slightly spread the sheaf both ways from the band; this will permit of the sheaf being thrown about after it is headed without fear of the band coming off. I prefer Mr. Marshall's plan of stooking, that is to lay the sheaves flat, first row heads to the east, all the rest heads to the west; when the stook is completed it will leave it in a position to stand a fair amount of wind and rain without injury.

When carting commences the greatest care is necessary, else a great waste of wheat will result. The loader should stand as much as possible in the centre of his load and work to the back and front of his wagon, using a fork to load with so as to avoid walking about on the sheaves; he should, when it is necessary to move, be careful to stand only on the bands of the sheaves. As

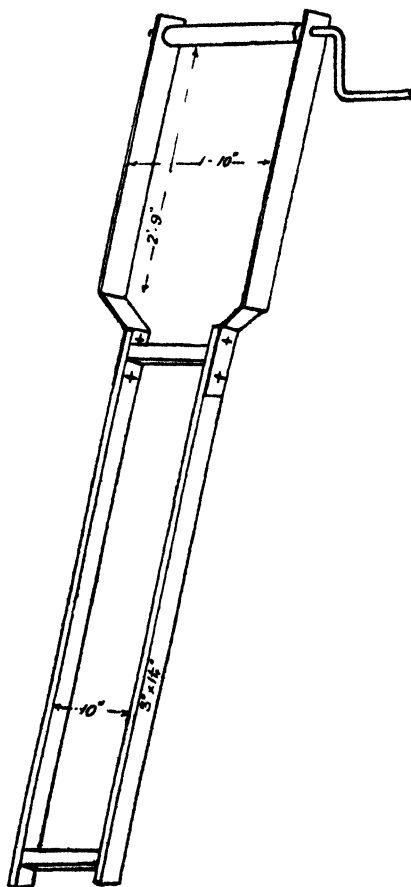
Moody's header will take the sheaves through at a rapid pace it is necessary for two men to pass them from the wagon to the feeder, as one man would have no time to study where to place his feet; the result would be a terrible thrashing out of the wheat, and as the grains would fall into the butts of the sheaves under them they would not be recoverable and would pass into the stack instead of the bag.

To describe fully the Moody patent header, with which my crop was treated, would take up too much time and space, but as the principle is different to other makes it is necessary for me to explain a little. The sheaves are passed down a slide from the wagon to the feeder broadside on and not endwise as with other headers; it is simply placed in position by the man feeding according to the length of the sheaf, by means of a travelling belt of canvas with battens across; the sheaf being placed on the belt is carried across the machine, held firmly in position by a pair of grip wheels, and thrashed by the header prongs (which revolve at a great speed) as it travels across the machine; it is then dropped on to an elevator and carried on to the stack; the wheat is passed to a drum where it receives a final thrashing; it is then winnowed and bagged, and loose straws separated from the chaff. If the machine is properly manned and fed the sheaves go through in very rapid succession, resembling sheep going through a race; about eleven hands (some of these may be boys) can cart from the field, thrash, stack, &c., 30 tons or more per day. The number of hands employed appear to make the process expensive, but when we consider the large quantity of stuff handled per day and the work accomplished, besides having all your wheat, chaff, straw, &c., brought to one centre, each separated from the other, I think it will leave a substantial balance on the right side. I may say that apart from the straw sold from my crop I have several tons of useful feed, as cocky chaff, &c. In seasons of scarcity and high prices headed straw would become a valuable asset and possibly yield nearly as much as the wheat taken from it. In any case a great number of the poor stock that are to be seen on many farms in winter could be kept in good thriving condition and more of them.

AN American fruitgrower reports that he has prevented birds from attacking his fruit by spraying with a mixture made by dissolving 4lbs. whale oil soap in 4galls. of hot water to which 1pt. of kerosine is added and churned thoroughly. One quart of this is added to 4galls. of hot water, and applied at 120° to 130° F., just before the birds usually commenced their attacks. Others have been very successful in destroying birds with powdered strychnine applied to fruits that have been attacked. In this case it is essential that no bird-pecked fruit are eaten by the household, and that notices warning people of the danger are posted up. Linnets seem the worst bird pest, and one grower reports having picked up over 400 dead birds in the one season. Strychnine was used by this grower.

"SAMPLING" AT SHOWS.—A lad of 13 years of age was charged at Clerkenwell Police Court, London, with cutting off a piece from a cheese exhibited at the Dairy Show in the Agricultural Hall. The magistrate said he could have been charged with larceny, but let him off with a fine of £1 1s. The value of the cheese taken was less than 2d., but the damage to the appearance of the exhibit being greater. At nearly all shows in Australia there are people who do not hesitate to "sample" any exhibit which may excite their greed—especially in regard to cheese, nuts, and dried fruits. If the stewards had the courage to prosecute a few of these offenders the exhibitors at shows would be more numerous and the public generally would be better pleased.

SOME HELPS FOR FARMERS.

**A Sack Loader.**

Mr. J. J. Gebert, of Richman's Creek Branch, uses a cheap contrivance for loading sacks of wheat on to the wagon as illustrated alongside. The uprights are of timber 3in. x 2in., 10in. apart. The top part is best made of iron 22in. apart, and 2ft. 9in. in height, to allow the bag to fall through. It should be stayed on each side with small irons. The roller should be 2½in. in diameter, crank handle 12½in. The rope for winding should be small. When in use the lower part should reach above the first layer of bags, on the rail of waggon, and should be strapped to the rail. It should have a slant of 12in. for every 21in. in height.

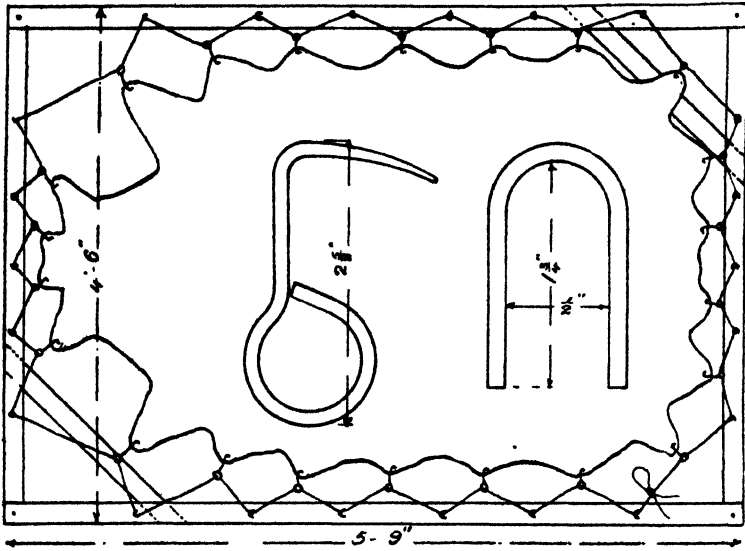
Frame for Stretching Sheepskins.

(From the "Australian Pastoralists' Review.")

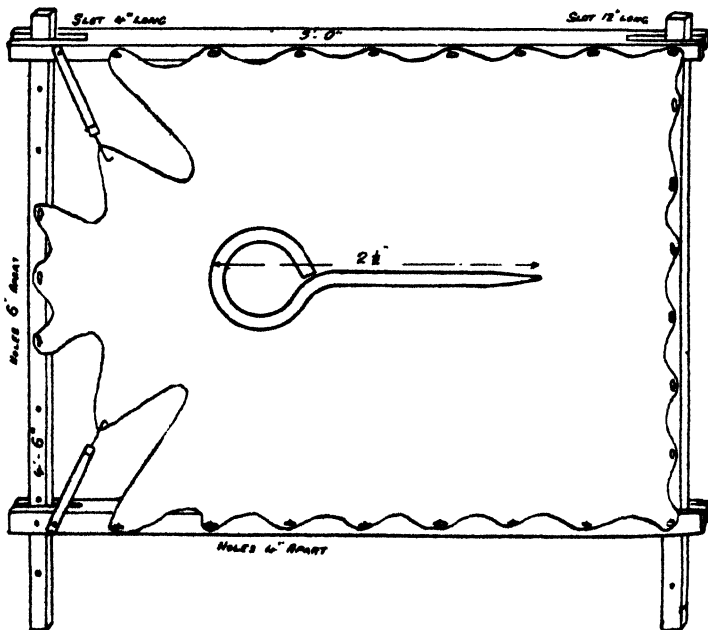
Herewith we supply diagrams of the frames for stretching sheepskins invented by Mr. Josiah Bonnin, manager of Nalpa Station, South Australia, which have been found very successful. Buyers prefer stretched skins not merely because the stretching improves them, but because when an owner makes his men use the frame the skin always gets more attention and care than when hung anyhow over a rail. Mr. Bonnin has, in reply to our request, forwarded us a letter from Messrs. Elder, Smith & Co., of Adelaide, complimenting him on the almost perfect condition of three bundles of stretched sheepskins recently sold by them in Adelaide, together with account sales note showing that five pelts sold at 2s. 10d. each, twenty-six at 2s. 3d., twenty-one at 1s. 9d., and four at 1s.

Referring to the frames (writes Mr. Bonnin), No. 1 is worked by means of a thin rope—sash line, I use—33ft. long; this is run through the staples and hooks (diagrams of exact size of which are shown, made of No. 6 fencing

wire on the station). The points of the hooks are just passed through the skins when the rope is slack. The rope is then drawn tight and looped



together, when the frame can be set up on its end, or suspended by the line, which will also assist to stretch the skin, which, as soon as dry, should be painted with an anti-weevil compound.



No. 2 frame, which appears to make a rather squarer skin, is fitted with slots and tenons for the purpose of adjusting it to the size of the skin, as shown in diagram, and has the two long sides fitted with seven spikes, the two ends with holes for iron pegs. The skin is first placed on the spikes of the two sides, then for top and bottom the iron pegs are passed through it and into the holes, skin being stretched meanwhile.

The materials of which both frames are made are 3in. x 2in. deal; ordinary purling stuff will do.

SELECTION OF SEED.

In an article on this subject in the annual report of the Farmers' Institutes of Ontario, Mr. C. A. Zavitz, of the Agricultural College, Guelph, gives the results of experiments conducted for several years to test the relative yields from small seed, large seed, plump seed, shrivelled seed, &c.

An interesting experiment was conducted for three successive years with wheat which had been harvested at five different dates. In the average results of this experiment it is found that the heaviest weight per measured bushel and the largest yield of both grain and straw per acre was produced from the ripest seeds. The results of experiments at a number of American stations appear to show that while immature seed shows a tendency to produce an earlier crop, the plants are usually much weaker than those produced from mature seed.

Experiments with different sizes and weights of seeds have been conducted over a period of four or five years, both in boxes in the laboratory, in single rows in the field, and in larger plots in which thousands of seeds have been used to ascertain the exact yield per acre produced by the different selections. The following shows the average returns from large and small plump seeds:—Oats, large plump seeds 51.9bush., small plump grain 40bush.; barley, 44.3bush. and 41bush. respectively; spring wheat, 21.7bush. and 17bush. respectively. It will be seen that the yield from large plump seed in each case was considerably larger than from small plump seed. Then the experiments were continued with the inclusion of shrunken seed. It was found that the crops from large plump seed were not only larger, but there were much fewer grains to the ounce; in other words, large seed produced heavier yields and heavier grain than the others. With wheat the figures were:—Large plump grain, crop averaged 949 grains per ounce; small plump grain, crop averaged 1,112 grains per ounce; shrunken grain, crop produced averaged 997 grains per ounce.

Similar experiments were conducted with mangolds, carrots, and turnips, and the results in every case showed that large sound seed gave much better results than either medium or small seed.

Experiments have also been conducted at many experiment stations in America, showing results in favor of large seed as compared with small seed for crop production.

At the Guelph Agricultural College, in the average of five years' experiments with spring wheat, the plump seed gave an increased yield of 23 per cent., and a weight per measured bushel of 6.4lbs. over that of shrunken seed.

TOMATOES.—For jam there are few fruits that excel tomatoes, provided they are first peeled. It is easy to peel them after they have been plunged for three seconds in boiling water. A few drops of oil of lemons added to the jam or jelly one minute before removing from the fire will make a pleasant variation. Sliced green ginger or preserved ginger added to the jam or jelly is also very nice. In all cases tomatoes should be peeled before cooking.

PROGRESS IN DAIRYING.

At the usual meeting of the Dairy Board, held on March 2, the Chairman, Mr. R. Caldwell, M.P., submitted the following report :—

Having recently visited some of the dairy factories and other institutions connected with the dairying industry in the colonies of Victoria, New South Wales, and New Zealand, the following notes on my observations may be of interest :—My inquiry was of a two-fold character. In the first place I desired to ascertain what assistance was being rendered to the dairy industry by the different Governments, and in the second, what those in charge of the industry were doing to help themselves. In Victoria, although the system of encouragement by bonus has been discontinued, everything in reason is still being done to develop the industry. Victoria is undoubtedly the pioneer colony, so far as the dairy industry is concerned, and it is highly creditable to her Government to find that, though some of the recent years have been other than favorable, the industry in question has been making satisfactory progress. Factories and creaming stations already established can be numbered by hundreds, and, according to report, production in old centres is steadily on the increase, and fresh country is from time to time being added to the area from whence the milk supply is drawn. The Secretary of the Department of Agriculture, Mr. D. Martin, has long been doing his best to obtain and circulate the most reliable information amongst dairy farmers; and even at the present time, in addition to the task of directing the movements of experts and lecturers, it is notified in a pamphlet issued by the department that farmers and others desirous of receiving instruction respecting the testing of milk by the new process will receive the assistance they need on application. It is further notified that "in case of disputes arising between milk suppliers and managers of butter factories and creameries regarding the percentage of butter-fat contained in any supplier's milk, the expert attached to the dairy section of the department will test samples of milk free of cost by either visiting the factories or creameries, or receiving a sample of milk that has been collected by the 'drop' system by the manager, and testing it in the department's laboratory in Melbourne." Excellent trucks are provided by the Railway Department for the conveyance of dairy produce to the cool stores; and, for the better cooling of these, ice is supplied by the Stores Department at 10s. per ton. The ice is manufactured by a Hall's refrigerator. The cost of receiving, storing, and shipping of butter intended for export is 2d. per box of 56lbs., and the greatest care is taken in the handling of it. The price mentioned covers grading and marking. The week's output of a factory is generally examined as one parcel, and is either marked as fit or unfit for export; no further classification is attempted. The manufacturer at an early date is made aware of the result of the examination. No attempt has yet been made to force the acceptance of the pasteurising system, but advice and information are being freely tendered by chemists and specialists attached to the department, and in the event of a factory resolving to adopt the new process, the department is willing to supply gratis the necessary "cultures."

The Government of New South Wales has not yet accepted any responsibility in connection with the dairying industry further than in providing for a good class of cool trucks on the railway and the free supply of the "culture" needed in the adoption of the pasteurising process. A small laboratory has been established, whence several factories are already obtaining "cultures" and instruction. Provision has also been made, as is the case in Victoria, for the diffusion of up-to-date information. The provisions of the Health Act having to do with the inspection and destruction, when necessary, of diseased stock are being enforced. Several inspectors have been appointed, but

information promised me by the Health Department has not yet come. Objection is being raised in some localities to what is considered unnecessary interference, but cases were mentioned where the owners of valuable stock highly approved of the action of the Government in this direction.

In New Zealand, under a recent enactment, similar action is being taken; but there the owner of diseased stock destroyed in the interests of public health is compensated to the extent of half the value of the victim, and in the event of a mistake being made by the officers of the Department the full value is allowed. No great objection is being raised, as the provision just referred to guarantees the owner against any rash interference.

All railway lines in New Zealand are constructed on the narrow gauge, but very suitable trucks are provided for the conveyance of butter and cheese. These are generally supplied with ice placed in a small trough suspended below the centre of the top of the carriage. The ice is supplied by the Cool Storage and Freezing Company, at the cost of £1 15s. per ton. The refrigerators used in its production are the Hercules and a dry air ammonia machine of a somewhat similar description. The premises and machinery used in the storage of butter and cheese intended for export are the property of private companies or a private company, who have entered into an agreement with the Government to do the work for a little under a farthing per pound ($\frac{3}{4}$ of a penny) up to 250 tons. The excess on deliveries over this limit is charged 10 per cent. less. This arrangement covers receiving from the trucks, classification in the grading-room, removal from the grading-room to the cool chambers, and the removal from the cool chambers to the steamer. The grading is done at each of the dépôts by officers appointed and paid by Government. As a rule these men have had long experience in dairy factories. The greatest care is observed in the grading process. Boxes of butter representing each churning from a given factory are carefully arranged by the employés of the contractor; the lots are then examined separately and judged according to merit. The secretary or the chairman of the directors of a company is advised of the merits or demerits of the produce. The cost of inspection, storage, &c., is entirely borne by Government. Two dairy schools are about to be established by Government, one in the North Island and the other in the Middle Island. For many years several dairy instructors have been moving about amongst the farmers giving instruction in the arts of butter and cheesemaking, and quite recently the services of a gentleman with the highest qualifications had been secured. Mr. Ruddick, the new Commissioner, has had extensive Canadian experience, and holds exceptional testimonials of efficiency as a maker and instructor. Although a firm believer in the advantages of pasteurisation, he is making no effort to force the system on the acceptance of the dairy farmer and manufacturer. In the absence of the most accurate knowledge, he considers it would be a mistake to recommend the departure. In this he agrees with the attitude taken by the dairy expert of Victoria, Mr. David Wilson. But in New Zealand, as in the other colonies, a preference for the system is being shown, and such knowledge is being imparted as will lead to its early and satisfactory introduction. The visit of the Commissioner is hailed with delight by factory managers, as they are pleased to compare notes with one so thoroughly proficient.

Now, with respect to the operations of dairy factory companies, I will only attempt to give a few of the more important and more striking particulars. Of the hundreds of factories and creaming stations in Victoria my examination was confined to two in the Western District, which were said to be high-class establishments. These I found provided with every convenience that experience had proved to be desirable. Nearly the whole of the buildings are of wood. Many of the companies make both butter and cheese, consequently a considerable storage space has to be provided for. In most of the factories

the patent "hoist" (that costs about £12 10s.) for the handling of milk or cream is in use. The milk, whether intended for the manufacture of butter or cheese, is almost invariably paid for in accordance with its value in butter fat. The butyrometer test seems to be preferred, as being quicker than the Babcock, and quite as accurate. In the manufacture of cheese the Cheddar system is popular in Victoria, but in the Western District greater importance seems to be attached to the manufacture of butter, as the market is considered more reliable. Many of the factories have creaming stations, or milk depôts, attached. A charge is sometimes made that is expected to cover the cost of the carriage of the cream to the central factory. The levy varies according to distance. The idea seems to be to charge for the extra work done. The Victorian practice obtains in New South Wales, as most of the factory managers in the latter-named colony served their apprenticeship on the southern side of the Murray. Although the Berry factory, in the Illawarra district, is a proprietary affair, it is one of the largest and most complete butter factories in any of the colonies. Neither money nor experience have been spared in securing premises and plant equal to the requirements of advanced business. Here the pasteurising process has been adopted with results said to be eminently satisfactory; and here I saw the only scientific method for dealing with the "waste" applied. The method appeared to be as satisfactory as it was simple, which was to collect the waste, or to cause the waste to gravitate towards a convenient centre, and as it was falling into the escape pipe apply the steam exhaust. This had the effect of pasteurising, or cooking, the refuse so as to render it inoffensive and germless. The outlet of the escape pipe is about 100 yards from the factory, and I was informed that the health officer was perfectly satisfied with the result. At any rate he had good cause for satisfaction, as my sense of smell is fairly acute, and I could detect nothing objectionable.

While in New Zealand I visited several typical factories in both islands. The milk is invariably purchased on the butter-fat test. In some instances 10lbs., 10½lbs., and 11lbs. of milk are reckoned to the gallon. One company, at least, whose establishment was visited, purchased at 10½lbs. from shareholders and 11lbs. from non-shareholders. The desire was to run the concern on strictly co-operative lines, and thus force all suppliers to become shareholders. In not a few factories neither coloring matter nor preservatives are used; in others, only the smallest percentage. In the manufacture of cheese the Canadian-Cheddar method has long been adopted. It is, in fact, the only system known in New Zealand. It is contended for the process that it secures uniformity of character, early maturity, and better keeping qualities. Some even go so far as to say that cheese made under this process is more easily digested. But on this head doctors differ. One advantage of the system seems to lie in the fact that cheese made under it can leave the curing-room at the end of thirty days, and may then be safely deposited in the cool room of a steamer and sent to the other side of the world. After the Cheddar is a month old, it is said to be none the worse for being stored in an atmosphere of 40° Fahrenheit. In paying suppliers, the common practice seems to be to allow between 7d. and 8d. per lb. for the butter fat at the end of the month, and, if there is a surplus, divide on the butter-fat basis when the half-yearly balance is struck. The practice of the suppliers washing and steaming their cans at the factory is becoming general. In advanced factories the more thorough lighting of the butter-room is also receiving attention. For the insulation of cool rooms pumice gravel is greatly preferred to charcoal or any other substance. Several factories visited had only a door-window opening to the cool room, say, 3ft. by 3ft., the sill being from 3ft. 6in. to 4ft. above the level of the floor. Experience has shown that this method tends to the better preservation of the cool air than when the opening is on the level of the floor. Most of the floors of the making-rooms were of

strong cement gravel. A few were seen of hard imported tiles, and at least one of a substance composed of val de travers, or lava rock from Vesuvius, mixed with bitumen. This material secured an almost perfect surface, at the cost of 7s. 6d. per square yard. Additional information is given in a series of articles contributed to the *Advertiser*.

In conclusion, I am pleased to say that I found the secretaries and the managers of the companies visited exceedingly obliging, as was also the case with the officers of the Department of Agriculture in Victoria. My especial thanks are due to the Government of New Zealand for the substantial assistance that they rendered me in the prosecution of my inquiry. The attention received from the Right Honorable R. J. Seddon, Premier, and some of his colleagues in office, during my visit, will not soon be forgotten. Neither must the officers of the Government of these cool green islands be overlooked, for they sent me away simply loaded with information, and almost groaning under a weight of obligation that, I fear, I will not soon be able to discharge.

HARD BUTTER.

By G. S. THOMSON, DAIRY INSTRUCTOR.

A few inquiries have been made concerning the cause of hardness in butter at this period of the year. In many districts hardness may be put down as a "fault," and damage to texture and appearance very often follows through the influence of working, especially when the process is practised a second time at an interval exceeding two hours from the first working. The composition of food and period of lactation in cows has much to do with the proportions of the different fats found in milk. Altogether there are said to exist ten fats; namely, stearin, palmitin, olein, butyrin, caprylin, caprin, laurin, myristin, and butin. The first two are solid fats, the third liquid, and the remaining seven volatile. On the percentage of solid fats the hardness of butter greatly depends, and in the percentage of volatile fats is the flavor dependent. In South Australia, volatile fats are distinctly high in percentage, thus accounting for the prominence of flavor or aroma. At the present periods the hard fats are, in all probability, above the average proportion and, with increased solidity due to the composition of food, in having a low percentage of water with concentration of food constituents. In the early season of the year, when green fodder is plentiful, the quantity of milk is above that of the present time, but quality is poorer and softness of hard fats is increased and of greater proportion, but there appears to exist an increase in the volatile fats. Season of year, with regard to temperature, also influences the quality and solidity of butter, together with breeds and ages of cows, as well as the district they are fed upon. The solidity of butter would be reduced by the addition of a little green or succulent feeding. A fair proportion of the present dry herbage is undigested by the cow, owing to scarcity of moisture and nonvariation of food. If cows are fed for a period upon dry herbage, afterwards given daily a quantity of sorghum or lucern, the supply of milk will increase to a marked degree, and the quality will remain high—the result of a more perfect digestion and utilisation of the dry food, aided by the moisture and immature constituents of the sorghum or lucern. In such a case the fats would appear in the milk with a softer texture; the few cows coming into calf at this time would alter the solidity of butter considerably. In the manufacture of butter in troublesome districts, it is advisable to thoroughly ripen the cream, work at a temperature of 62° to 64°F. and churn the cream into fine grains, thus holding additional moisture. Work the butter carefully, followed by a second working after a very short interval.

THE CABBAGE FAMILY.

Whether cultivated for table purposes or for feeding farm stock all plants belonging to the Order Brassicaceæ are of great economic importance. To this order belong turnips, kohlrabi, swedes, kales, cabbages, cauliflowers, sprouts, rape, and a host of others.

Brassica oleracea, the wild cabbage, bears very little resemblance to the beautiful varieties of cabbage, cauliflower, &c., which have been developed from it by lengthened cultivation and selection. In nature the plant is quite weedy, under cultivation we produce solid heads of succulent leaves weighing anywhere from 2lbs. to 40lbs. weight, or the delicate cauliflower, or the various other delicious forms which are to be constantly found upon the market stalls.

The cabbage family require a deep, rich, moist soil for their perfect development, and must be kept growing vigorously from the sowing of the seed until the gathering of the crop. It is almost the universal practice to raise young plants first in nursery beds, meanwhile thoroughly preparing the plot on which they are to be finally planted by heavily manuring and deeply digging and pulverising. The nursery beds should be deep, rich, sandy loam, made level and very fine on the surface. Sow the seeds in shallow furrows made by pressing a sharp-edged board into the soil, or by scratching to a depth of about $\frac{1}{4}$ in. If the seeds are 1 in. to 1 $\frac{1}{2}$ in. apart the plants will grow strong and quickly, but it is a common practice to sow much more thickly. Cover level with the surface, and press the soil on the seeds by slightly beating it with the back of a spade. The drills should be 3 in. apart and directly the plants come up the intervening spaces should be loosened up. Give water frequently, and once a week give a little weak liquid manure at the root only between the rows.

It is better to sow small lots once a week than to sow all seeds at once. For kitchen use commence with what are called "early" varieties; continue with medium early, follow with main crop, and finish with early sorts. [The term "early" means "quickly maturing"] The young plants should be ready to plant out within four to six weeks after sowing the seed.

The land should be thoroughly well prepared during the time the young plants are coming forward. Plenty of farmyard or other nitrogenous manure should be well mixed with the soil, which should be dug deeply and be well pulverised.

Large sorts of cabbages should be planted at least 3ft. apart each way—better 3ft x 4ft, and smaller varieties 2ft. x 3ft. apart. If the plants are of a good size cut away two or three of the bottom leaves before putting them in, especially if the weather and the soil are both rather dry. Choose a cool cloudy day, if possible, for planting out.

If caterpillars or aphides are on the young plants dip the whole of the leaves and stems, *but not the roots*, into a bath of tobacco water (3ozs tobacco waste to the gallon of water, or $\frac{1}{2}$ oz stick tobacco) or tar water (1oz. to 6galls. boiling water, stir, and use cold).

Before lifting the young plants give the bed a good watering, and lift the plants with soil attached to the roots, or else dip the roots at once in a "puddle" made with clay, soil, and old cow manure, equal parts, and enough water to make a creamy mass.

Dibble the holes just deep enough to accommodate the full length of the roots. Hold the plant in the left hand by the leaves, drop the roots into the hole, drive the dibber into the soil at an angle of about 45°, so that the point will just about reach as deep as the first hole; bend the top of the dibber towards the head of the plant, so that the soil shall be pressed up against the roots from bottom to top; then fill up the other hole with water and cover in the soil. In all cases it is desirable to apply water at once to a plant when put in.

From this time forward the plants must be kept growing vigorously. Nothing will promote this object more effectively than frequently stirring the surface. Never let it become caked. After every watering and after rain, as soon as the soil becomes dry enough, rake it up. Mulch the bed with old manure, or else apply weak liquid manure twice a week *at the roots*. It is altogether wrong to apply liquid manure upon the leaves of any plant.

If the above directions are strictly observed it will be almost impossible to fail in growing good cabbages, cauliflowers, &c.

In field cultivation of cattle-cabbages, kale, kohlrabi, swedes, turnips, &c., the same care cannot be given, nor is it so much required. They all thrive best upon a soil rich in nitrogen, and require also a fairly liberal supply of potash and phosphoric acid. Add a sufficiency of moisture in the soil, and good crops are almost a surety.

CATTLE DISEASE AT PETERSBURG.

During the past two or three years Mr. R. Cochrane, a member of the Petersburg Agricultural Bureau, has lost a number of cattle from some unknown disease. The disease seemed to be confined to cattle grazed on one particular paddock, and, at the request of the Bureau, Mr. R. J. Needham, Deputy Chief Inspector of Stock, visited the farm on more than one occasion. He was of opinion that the cattle were affected by impaction or æsthenic apoplexy, caused by poorness of the blood, due to the absence of nutritive properties in the feed.

As fresh cattle brought on to the farm soon became affected, the Minister of Agriculture was asked to authorise a special investigation, and Dr. Ramsay Smith, Honorary Pathologist, Adelaide Hospital, was deputed to make an inquiry into the complaint. The following report has now been submitted to the Hon. Minister:—

“On January 9th I visited Petersburg in company with Mr. Valentine and Mr. Needham. On January 10th we visited Mr. Cochrane's farm and the paddocks at Black Rock Plain, some ten miles distant. Mr. Cochrane supplied information regarding the outbreak and course of the cattle disease. At his farm we saw one cow recovering from the disease. At Black Rock Plain we saw one cow very bad with the disease, and another one dying from it. We were able to study the symptoms of the disease in these two. The dying one was killed, and we made an examination of all the organs in the body. The following is a summary of the results of the investigations:—

“The cattle that have taken the disease have all, with one single exception, been grazing in one particular paddock on Mr. Cochrane's farm. The disease appeared two years ago, and up to the date of our visit thirty-six cattle had died from it. There had been no case of recovery, with the doubtful exception of the cow mentioned above as recovering. Age, sex, breed, condition, time in the paddock, and season of the year appear to make no difference in the appearance of the disease in the affected animals. Horses have not taken the disease. No sheep have been grazed in the paddock. Cows from the outside introduced into the paddock have taken the disease, and have died within twelve hours of being placed in the paddock. On the other hand, animals affected with the disease have lived for eight days. Only one case occurred on the farm not in this paddock. This occurred in what is called the wheat paddock. Cattle removed from the paddock to Black Rock Plain have taken the disease at varying intervals after removal, and have died from it. There has been no case of the disease spreading from or being carried by one animal to another. Every animal that suffered had been in that paddock, with the exception of one case above mentioned. From these facts alone one would conclude that the disease

is probably not infectious or contagious, but depends on some cause which exists in that paddock and another paddock on the farm. This conclusion is confirmed by the *post-mortem* examination. All the symptoms are to be traced to the impaction of undigested food in the stomach. The rumen contained about 1cwt. of foul fæcal-smelling food stuff. The reticulum was firmly crammed with material that resembled a composition of hard-baked clay and dry tar-paving. The gall bladder was distended, and the liver was saturated with bile. The intestines were empty. All the other organs were healthy, and a four months unborn calf which the cow contained was healthy. Pieces of all the organs were preserved for microscopic examination, and revealed no disease."

Dr. Smith and Mr. C. J. Valentine, Chief-Inspector of Stock, unite in the following opinion:—"1. The disease is not infectious or contagious. 2. The flesh of the affected animals is perfectly wholesome and fit for human food. 3. The disease is preventable, being dependent on conditions of food and water supply. 4. The affected animals should be treated on the first appearance of the disease, since the chances of recovery are small after the symptoms are well marked. We recommend a further investigation of the grass and water supply of the paddock in question, with a view to discover the precise nature of the conditions that are the exciting cause of the disease."

CIDER-MAKING.

Statements have been made from time to time that it is an easy thing to make good cider in South Australia, and that any kinds or a mixture of all kinds will serve that purpose. Both statements will bear some modification. Good cider can only be made by those who know something about the work, and the cider must be made of good sound apples—"cider apples" by preference—in a place where a slow, steady, even, and complete fermentation can take place. Several attempts have been made by men who have had good experience in Europe to make cider in this colony, notably by the late Mr. Chas. Giles, sen., at Grove Hill, and by the late Signor Paolo Villanis, at Highercombe. The partial if not actually complete failure of those two experts may fairly be attributed to the absence of cellar accommodation contributing to a slow and complete fermentation of the must, and partly to the use of the ordinary marketing apples. It must be admitted that almost any kinds of apples can be used for cider making, but in order to make really good cider the maker must have a fairly large proportion of cider apples and russets. Sweet apples produce a cider of poor flavor and little "character," whilst the cider and russet apple combination yield a liquor of very palatable nature, whilst the greater astringency of the fruit makes the cider more easily clarified, and it keeps better, whilst more juice is contained in these varieties than in most of the table sorts. About 1,200lbs. cider apples will produce 60galls. cider. Some makers prefer to use a third or a fourth part of pears in the crushing, which imparts a distinct flavor to the liquor. It was recently stated that it is as easy to make good cider as it is to make good wine, but when the difference in composition of apples and grapes is considered it may well be doubted if the assertion is borne out by facts. Grape juice often contains over 20 per cent. of sugar and only 0.5 per cent. of acids, whilst apples often contain 8 per cent. to 10 per cent. of acids and only 8 per cent. to 9 per cent. of sugar.

In the south of Germany about one-third of pears or one-third of sweet apples is used in the manufacture of the best cider. In England they use apples only in the same proportions, reserving pears for making perry. Some makers add a certain quantity of sugar and of water to the apple juice, in order to bring the constituent juice to a nearer equality with that of the grape, and thus secure

a more even fermentation. They usually add sufficient sugar to raise the saccharine to about 12 per cent., which, if well fermented, would give about 6 per cent. alcoholic strength. For each per cent. saccharine deficient it is usual to add 2-2lbs. sugar to each 22galls. liquor pressed from the fruit.

When the fruit is ripe, but not over ripe, it is to be picked carefully, without bruising, and rejecting all damaged fruit. It is then placed in heaps to sweat and mellow for twelve to fourteen days. This sweating promotes a uniform quality in the fruit, reduces a portion of its moisture, and enables the press to extract the juice more evenly and surely, aids the process of fermentation, the clarifying of the cider, and its flavor, strength, quality, and keeping properties.

After crushing the pomace is placed in coarse bags, put on the bed of the press to drain, and then pressure is gradually put on until liquor ceases to flow. The first half of the liquor is sometimes fermented separately, to produce a superior quality of cider, but generally it is all worked together. The juice is now tested by the saccharometer, and, if found deficient, sugar and water is added to bring it up to the required strength.

The juice is then placed in clean casks to ferment, being only two-thirds filled, to prevent waste during the process. If the temperature of the cellar can be kept at about 70° F. it is likely that the fermentation will proceed evenly, but if the must rises to 80° F. it should be drawn off into a fresh cask, in order to arrest any further rise.

Fermentation should be completed within a fortnight. Some careful makers then filter the liquor through large filter bags, and then run it into clean sulphured casks. Others leave the liquor to settle in the fermenting vats or casks for two or three days, and rack into clean sulphured casks. If it is desired to make sweet cider, the liquor is drawn off before fermentation is quite completed. A portion of it is placed in a cask containing sulphur fumes, well shaken up, then filled with the rest of the cider. If re-fermentation commences the process may have to be repeated, and racking will have to be resorted to once a month to get the liquor clear.

The above notes are chiefly founded upon an article by C. Mayer, Government Agricultural Analyst, Stellenbosch, Cape Colony.

ORCHARD NOTES FOR APRIL.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

In districts possessing a heavy rainfall, and where showers are almost continuous from April to September, causing the ground to become too wet to work upon with teams, the opportunity of ploughing the orchard immediately after the first rains of early winter should be seized without fail. If the ground has been artificially drained, or has natural drainage facilities, the rain can then be utilised fully, for in this climate, with reasonable provision for carrying off the surplus water, which falls over a brief period only, there is little danger of excessive wetness causing injury to the trees.

The completion of the harvesting operations for deciduous fruits will be pretty well reached during April this year, and as the subject of harvesting and housing apples has been dealt with in a separate paper I will not deal with the matter further in these notes.

The preparation of land for planting should be pushed on. My observations lead me to pronounce in unmistakable terms in favor of autumn planting for deciduous trees, so that root action may begin during the winter season and the trees have a start upon the dry weather when the full growing time arrives. The transplanting of citrus trees could be done successfully now, but as these trees really become dormant during the winter, both in root and top, as far as

outward appearances go, there is no advantage in disturbing them now. In fact, the broken roots frequently rot and the leaves fall, which are without doubt disadvantages. I think, for general orchard and garden planting, no error will be made if the transplanting of deciduous trees be undertaken very early in winter, and that of evergreens during the early spring days.

In the nursery, careful attention should be given to loosening the ties upon stocks, whether the buds have united or have died. If this be neglected, constriction of the stem at the tied section takes place, and the buds that have taken are killed (strangled), or if the buds have failed, the stock may be ruined as far as any further attempts at budding are concerned.

The pips and stones of fruits intended for the production of stocks for budding or grafting should be set early to ensure a good average sprouting. This applies particularly to peaches. If the nursery ground is not ready, these pips and stones might be buried in damp soil between layers of bagging to start germination. Stocks of pear, quince, plum, apricot, peach, cherry, orange, and lemon are all raised from seedlings. Apples are only worked upon roots of recognised blight-proof sorts. In selecting seeds of pear, apricot, and peach, only those from common strong-growing kinds should be used; the more highly-flavored and delicate sorts usually produce sterile seeds. Only Myrobalan plum seeds should be used; ordinary plums sucker badly. Of cherries, the seeds of Mazzard or Mahaleb varieties are most esteemed for stocks. Orange and lemon pips should be either sown in boxes or sheltered frames and covered from frost, &c., for the first season, after which they are set out thinly in open nursery rows for future budding.

Deciduous trees should be allowed to mature their growths now and develop up their fruit buds. Heavy waterings now only produce watery immature shoots, which frequently die in winter or early spring.

Resin sprayings may yet be applied to destroy red scales: 10lbs resin, 10lbs. washing soda, 5lbs. soft soap, to make 50galls. of spray wash, is a proved recipe locally for this pest.

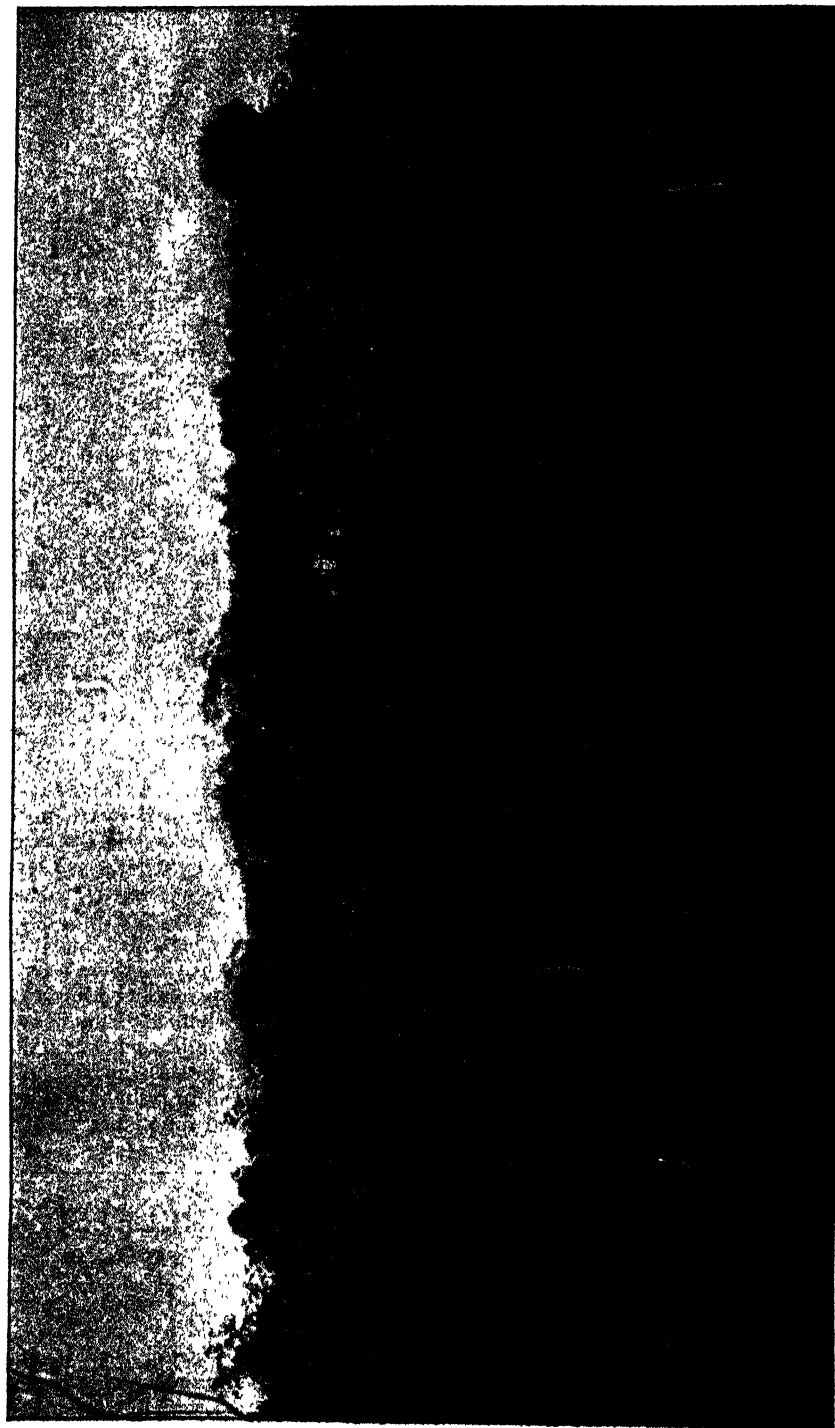
The bandages used as traps for codlin larvæ could be removed from early pears and apples that have been stripped of fruits for some weeks past, providing there are no other kinds still carrying fruits near by. Old stakes should be burnt, as the cracks in these harbor codlin moth larvæ over the winter. Great care should be taken in sorting apples, both for market and export, where this pest is found in the orchards.

The planting of strawberries may be undertaken in early localities, but it is no use to set out these plants unless the grower intends giving them a rich soil and careful attention. I have seen very fair results obtained on the Adelaide plains and excellent crops in the lower North, where the summer is hotter, but the soils were well supplied with manure, and applications of liquid manure and water were freely given. The ground should be broken up 15in. or 18in. deep and plenty of well-rotted stable manure mixed in prior to setting the young plants. The rows should be about 2ft. apart, and the plants set 1ft. apart in the rows.

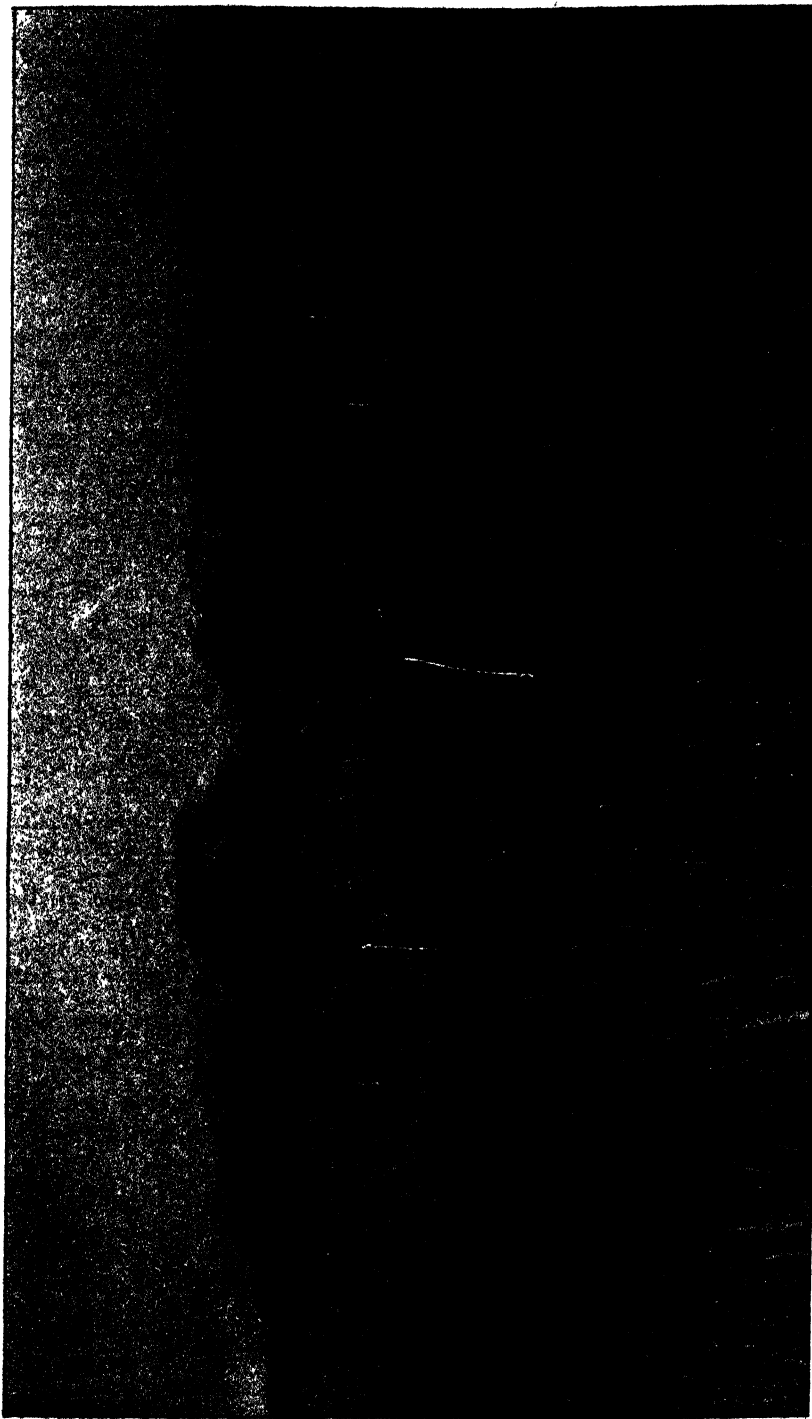
GOOD CULTIVATION VERSUS CARELESS CULTIVATION.

BY GEORGE QUINN.

On several occasions when visiting the Coonawarra Fruit Colony, near Penola, I have been particularly struck with the results obtained from the various methods of cultivation adopted by the different blockholders. During a recent visit I had an opportunity of procuring some photographs which were taken



No. 1.—BLOCK OF SEVEN-YEAR-OLD APPLE TREES AT COONAWARRA FRUIT COLONY, WELL CULTIVATED AND ATTENDED.



No. 2.—BLOCK OF SEVEN-YEAR-OLD APPLE TREES AT COONAWARRA FRUIT COLONY, BADLY CULTIVATED AND NEGLECTED.

by Mr. S. G. Spink at my request, and two of these are reproduced on the previous pages to illustrate the different results obtainable by careful cultivation and training as against careless attention and neglect, when applied to apple trees of a similar age planted upon soils practically alike.

The first photo shows a block of apple trees upon the holding of Mr. E. A. Stoney. The trees have been planted seven years, and, being pruned hard, have produced practically no fruit yet, but are fine types of well-framed sturdy trees, capable of carrying a great weight of fruit without splitting or collapsing. The photo. also shows a belt of sugargums at the boundary, which Mr. Stoney with characteristic foresight planted to protect his orchard from the prevailing winds.

The second illustration is taken from a block formerly occupied by a slovenly orchardist. The trees are of the same age as Mr. Stoney's, but they have been allowed a long stem, and scarcely any other pruning seems to have been applied. The ground, it is true, has been ploughed, but at a time when the least benefit is to be derived from the work. The trees, having no protecting belt, have yielded to the wind pressure and are, even with their present very light tops, showing signs of a desire to lie down. The crop of waving oats tells its own tale.

Although one may see room for improvement in the cultivation of many of the blocks on this thriving fruit colony, fortunately such instances of gross neglect are few and far between. If in this favored locality the baneful influences of neglect in cultivation are so clearly apparent, what must be the effect in localities of lesser rainfall and inferior soils? The Coonawarra colonists have in these illustrations a striking object lesson on this subject, and it is to be hoped will profit thereby; anyway, I thank them for the opportunity provided of securing the illustration for the benefit of others.

NOTES ON VEGETABLE-GROWING FOR APRIL.

By GEORGE QUINN.

In most parts of this colony the ground usually receives a fairly good soaking during this month, and the early plantings of vegetables are made outside those areas where irrigation is possible.

Sowings will be made of red and silver beets, broad beans, parsnips, carrots, cress, lettuces, parsley, radishes, peas, spinach, turnips, onions, and swedes. I wish again to urge the advisableness of sowing these in rows, so as to permit hoeing to be done readily, for the purpose of killing weeds and aerating the soil when the rains of winter compact it closely.

Beans, lettuces, parsley, peas, spinach, turnips, swedes, onions, and radishes will all be largely benefited by having a dressing of superphosphate drilled in with the seeds.

In prepared beds, successional sowings of cauliflower, cabbage, celeriac, kohlrabi, Brussels sprouts, onions, and leeks should be made in all gardens, to raise plants for future transplantings.

If the ground in a garden has several sloping aspects, for the early winter growing crops a position which will receive the most sunshine, and sheltered from cold south-west winds, will be more likely to produce early maturity.

In small gardens, high close fences running east and west, or walls of buildings, should be avoided, as they cast long shadows across the plots and cause such shaded soils to become wet, cold, and possibly sour.

Thin out crops of beets, spinach, onions, &c., and transplant out cabbages, cauliflowers, onions, Brussels sprouts, celery, and kohlrabi, and, unless heavy rain is falling, give each plant a moderate watering to settle the soil around the roots.

Garlic and shallot bulbs may be set out now.

A light sprinkling of superphosphate scattered along the rows of growing vegetables, and gently forked or hoed into the soil, will be very stimulating to most kinds.

Early potatoes may yet be planted in localities where winter frosts are not severe.

Mulchings of well rotted stable manure may be spread over beds of rhubarb and asparagus, and lightly forked in, taking care not to damage the crowns of the plants. A few pounds of common salt to each square rod may be added upon the asparagus beds with advantage. If these plants are yellowing off, and there is danger of the seeds falling, the tops may be cut away, but there is plenty of time in most localities yet for taking this necessary precaution.

Different kinds of herbs may be lifted, divided, and the younger growths replanted, discarding the old central stems and roots. Bunches of leaves of herbs may be preserved at the same time as the division takes place, as the young plants will sprout better if the twigs are trimmed in keeping with the reduction of the roots.

The late fruits upon the tomato plants will ripen better if they are exposed to the sun and air. This is best done by lifting and tying the limbs an inch or two off the soil, and thinning out the twigs and foliage. Melons, pumpkins, etc., should be stored away in a cool dry place to keep until required.

Should cabbage aphides (blight) appear on the plants, a spraying given while they are yet somewhat scarce will often check the pests, and tide the plants over a critical time. Tobacco wash or softsoap and quassia chips have both been found excellent remedies.

The stirring of the surface soil with the fork or hoe is a very necessary work as soon as the regular rains begin, and all ground not now in use should be dug deeply with a fork and thrown up roughly to absorb all the rain possible.

Save good cucumbers for seed purposes. If these fruits are simply placed away in any position out of reach of vermin they dry up, and the seeds are readily extracted.

FRUIT TREE PRUNING.—No. 1.

By GEORGE QUINN, INSPECTOR OF FRUIT.

Under purely natural conditions all kinds of plants appear to grow with the one express purpose of continuing their individual species, and to this end each produces seeds of its own particular variety. Mankind has not been slow to note that when any particular kind is closely pressed for existence by its fellows of the vegetable kingdom the power of producing seeds greater in number is generally called to its aid.

When man brings any plant under cultivation he seeks to develop some particular quality which it possesses. If it is the symmetrical shape of the tree or its ornamental foliage which attracts his attention, he encourages that to a finality probably not existing in nature.

If it be the beauty of the flower that draws forth his admiration, that is the point around which his attentions are centred. If it is the fruit which arouses his interest, to that end are all his efforts directed.

Among the chief arts called in to produce the desired result is pruning.

How long pruning has been applied to fruit trees there is no record to show, but certain it is that the practice is an outgrowth of the observations and experiments of cultivators spread over very many generations indeed.

It is frequently urged by those who express disbelief in pruning that nature does not prune, but one has only to examine a fruit tree that has been allowed to roam and grow at its own sweet will to note how severely nature suppresses various portions of any tree.

Every bud that is formed upon a tree may be said to possess all the potentialities of an individual branch. This being so, take any limb of, say, an apple tree left unpruned by man and count the number of suppressed buds, and it will be found that the majority never get beyond an embryonic stage. It may be urged that these are held in reserve in case of accident, but should the possible happen, how many of these buds retain their vitality over a long period?

Again, it is urged that the process of pruning devitalises the tree and brings premature decay and death. Respecting the vitality of the tree it is difficult to sustain such an argument, as the retention of the vitality of a tree seems to be almost entirely based upon the suitability of its general surroundings.

Vitality in any tree cannot be described in any fixed ratio, as it is being constantly renewed, reduced, or augmented. Given two trees of equal vitality, planted in similar soil in the same locality, leave one to the care of nature, entirely without pruning. Granted that the other receives rational pruning and training from time to time and as good cultivation, and there can be no doubt that the vitality of the latter would be maintained to a much higher degree than with the former.

As has been previously mentioned, man expends his labor and skill upon fruit trees simply for the fruits they bear. He does not grow them because of certain magnificent proportions they may assume. In most instances it is only the fleshy or pulpy portion of the fruit that he desires; consequently he endeavours to increase the quantity of this particular portion to the depreciation of all others.

In a state of nature many fruits are borne, each containing a seed or seeds. It is these reproductive portions nature wishes to preserve and multiply. Man has found by experiment that if the numbers of these fruits be vastly reduced the substances assimilated by the tree are largely directed to increasing the size of this fleshy portion of the fruits: consequently he reduces the number of fruits, allows light and air to reach each one, and thus improves their general size and flavor, and causes them in many instances to ripen earlier. There are two ways of reducing the fruits, viz., by reducing by pruning the number of fruit-bearing buds; and, secondly, by plucking away the fruits after they are formed. By careful study and practice man has found in this process of reduction by pruning away certain portions that his objects may be attained and still the health of the tree be maintained for a profitable period; in other words, while obtaining the results sought he has found to what length he may go without interfering with the proper nutrition of the tree.

Speaking broadly, it may be assumed that by the practice of the art of pruning man is enabled to produce earlier and more regular crops of fruit of superior character. This is the ultimate object sought, but as the crude ore must first be refined and purified before it is in a condition to be shapen into all the beautiful and delicate articles which art has devised, so must the virgin fruit tree be shaped and trained by skillful hands before it reaches this goal of the cultivator's desires.

A young fruit tree may be said to be composed of a root or roots, from which arises a stem. Upon this stem, at fairly regular intervals, are placed buds, and immediately below each of these buds a leaf is developed. These buds will develop characteristics similar to the stem upon which they are found. The spaces between these buds may be said to act as carriers of nutriment to the buds, but only from the buds themselves will growths emerge. Although not so strictly defined in appearance as in the vine, we will for the sake of uniformity call these spaces internodes, which they as truly are.

Fruit trees are pruned at different seasons of the year, but the main pruning of deciduous sorts is done when the leaves have fallen. This is called—

WINTER PRUNING.

The pruning done whilst the foliage is on the trees is commonly called

SUMMER PRUNING,

but this is a misnomer, as very much of it is performed in spring.

Winter pruning is usually done by means of knives, pruning shears, or seccateurs, and saws.

Summer pruning is frequently performed with the thumb and finger, and only sometimes is the knife or seccateur called into use.

All tools used in pruning should be kept clean and sharp, so that diseases may not be introduced thereby, or rough sections—leaving slowly-healing wounds—be made.

In most places the seccateurs have almost displaced the knife owing to the greater rapidity and safety with which the work can be performed.

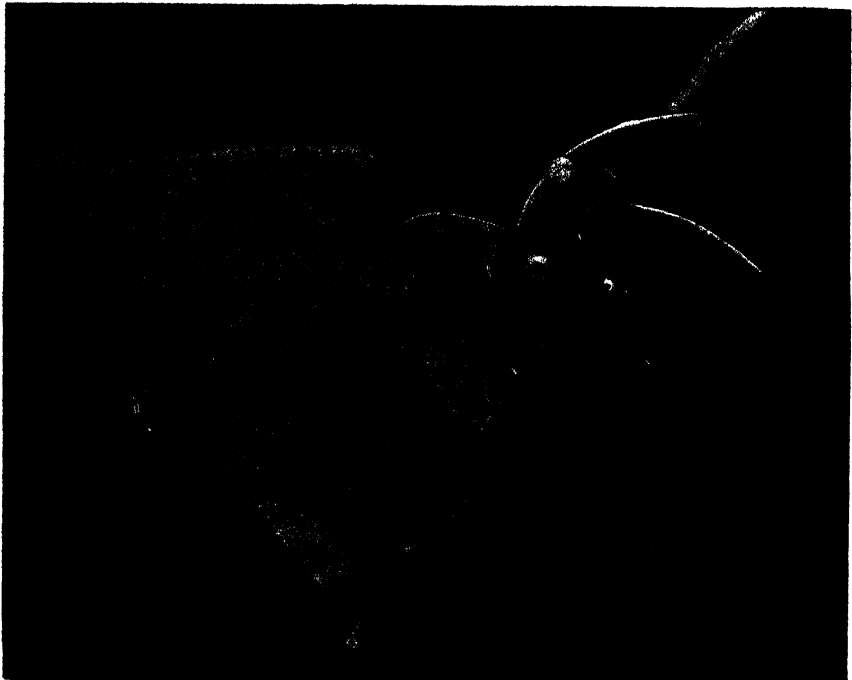


PLATE I.—HOW TO SECCATEUR WHEN SEVERING A SHOOT.

If a glance be given at our first illustration it will be seen that this tool is composed of two parts, terminating at one end in handles. Upon the other end of one is a curved blade, while upon the corresponding end of the other a curved steel block is seen. When a branch is being severed it rests in this curve, and the handles being closed together with force, the curved blade descends and cuts a section through the branch parallel to the curved block. If the sides of the severed branch be carefully examined it will be seen that the portion which rested upon the curved block has a crushed margin, while the section on the branch from the blade side is quite cleanly severed.

The reason for our first illustration will now be clear, viz., hold the seccateurs in such a manner that the bruised section is always made upon the piece severed from the tree.

As previously remarked, the arrangement of the buds and spaces upon the

branches of a fruit tree, though externally clear enough to be described as nodes and internodes, the internal characteristics are less clearly defined than in the grape vine, and as, with few exceptions, soft pith is absent in the internode and the woody partition not confined to the node, there is no need or gain in cutting the section through the node above the bud intended for terminal growth.

Experience has therefore taught that the nearest point at which the cut can be made above the bud intended to grow, without imperilling that bud's chances of growth, is the right position.



PLATE II.—SHOWING POSITION OF SLOPING SECTION RELATIVE TO THE LAST BUD RETAINED.

Our second illustration shows the approximate distance, as well as a gentle slope away from the bud which the section should take, so as to conduct moisture or any other descending substance away from the bud.

The practice which makes the lowest point of the cut begin directly in a line with the top of the last bud to be reserved for growth, and slightly sloping upwards above the bud, will be found quite safe and practicable in everyday work.

The main object of pruning fruit trees has been described, but in the attainment of this end the pruning has to be directed along certain fixed lines. These may be briefly described as—(1) Pruning to modify the form of the tree; (2) pruning to promote wood growth; (3) pruning to increase fruit production; (4) pruning to check the spread of disease or decay.

The primary step in learning to prune fruit trees is the acquirement of a knowledge of the different buds upon a tree, viz., flower buds and wood buds, and the particular growths upon which these buds are chiefly found on different kinds of trees.

Natural law has disposed that trees, alike with all organised beings, shall come to a certain stage of maturity prior to reproducing themselves, and as we are about to deal with young fruit trees I will not at this stage enter into a description of the shapes and positions of the fruit buds of different trees.

In a state of nature every plant when allowed free scope for action takes upon itself a typical form. When man introduces a plant to cultivation he provides the protection necessary to the development of this form, and utilises pruning to modify such a form to his best uses.

Wild grape vines climb over and entwine their stems around high trees, and many fruit trees spread in a more or less pendulous manner upon the ground, but both of these forms have to be modified as far as is in keeping with a continuance of healthy growth before these plants can be utilised to the fullest advantage by mankind, and to obtain this end he *prunes to modify form*.

Under certain vicissitudes of climate fruit trees are caused by means of pruning and training to take very many shapes, so that they may be grown under conditions far removed from those of their natural habitats. They are trained as espaliers, cordons, &c., against vertical surfaces, upon wires, or as pyramids in the open ground, but as these methods are not imperative under the favorable climatic conditions of South Australia I do not at the present at any rate intend dwelling upon them.

The modifications of the natural forms of fruit trees have been directed along certain lines until certain *types* have been recognised as suitable for certain conditions.

In the meadow orchards of England and elsewhere where hay or grass is grown beneath the trees, and animals allowed to graze, a type of tree possessed of a very long stem is favored, and our early colonists naturally followed the teachings of their ancestors in training the trees planted by them here. Under the altered conditions of climate and commercial competition now existing this type has been abandoned in orchards of later date.

The main object sought by the adoption of a distinct type of fruit tree in commercial orchard practice is to secure one *which will produce the greatest quantity of superior fruit at a minimum cost*. In this connection the type of tree which will permit all the necessary operations of orchard work being conducted with the greatest facility and completeness, and at the same time maintain its productiveness over a lengthy period, is the one to adopt. On the strength of these requirements in my mind there exists no doubt that for the general conditions ruling in this colony the most profitable type of orchard tree is a short-stemmed sturdy standard of a vase or goblet vase shape. From this tree the fruit may be comfortably harvested, the pruning and treatment for diseases easily and rapidly performed, the ground shaded in midsummer above the root system the soil cultivated without interruption, and it also possesses the strength necessary to withstand boisterous winds.

We will therefore proceed to follow through its varying stages the development of a tree of this type from the materials at hand.

In Plate III may be seen three fair types of young fruit trees as received from the nursery. Fig. 1 has been topped as it grew in the nursery row, consequently it has developed several shoots of varying strength from the main stem. Fig. 2 has received some check in its growth, probably owing to a slight dryness at the roots. This checked its first growth on top, and when active vegetation began afresh some of the lower buds forged ahead for a time, and produced about half a dozen shoots.

If this tree be examined, nature's pruning will be seen in the suppression of some shoots in the middle of the stem.

Fig. 3 grew in a dense bed of young trees, and, partly as a consequence of overcrowding, the lower buds have not had a chance to develop into shoots, and only a small proportion have grown at the top.

In Plate IV. I have shown how these types are often pruned, and later on will refer to the resulting consequences. Plate V. shows the root system of these three trees taken from beneath. The main roots are pretty well all broken at

their extremities, and, owing to being exposed to the air, the fibrous roots are nearly all dried up and dead.

. Plate VI. shows these root systems in the same order, trimmed carefully of all



FIG. 1.

FIG. 2.

FIG. 3.

PLATE III.—TYPES OF TREES AS RECEIVED FROM NURSERY.

interlocked roots, broken points, and dead fibres, ready for planting. It will be noticed that pretty well all roots smaller in diameter than an ordinary writing pencil have been cut away, and the main roots shortened considerably. The ordinary nursery methods of packing young fruit trees do not preserve the

more tender roots ; but this is not such a calamity as it may at first appear, as, when consideration is given to the manner in which the stem and branches are so greatly reduced, it will be readily seen that a balance may be regained. If a tree, the roots of which have not been pruned at planting, be dug up in twelve months' time and examined, scarcely any new roots will be found to have issued from the smaller roots. Just in the same manner as when the top of a young tree is left unpruned on being planted many of the partly-matured



FIG. 1.

FIG. 2.

FIG. 3.

PLATE IV.—SHOWING HOW THEY ARE FREQUENTLY PRUNED.

terminal twigs will die, and fresh ones emerge from the more solid wood below. Whether it is that they are immature and incapable of emitting other roots, I am unable to say, but think the reason why most perish is because of the exposure and damage received in being transplanted. The time spent in trimming these roots carefully would be more than counterbalanced by the saving of time in planting the trees. The too common error of making the

long horizontal roots fit the hole opened for their reception, instead of making the hole to accommodate the irregular roots, would be largely avoided.

In Plate VII. I have endeavored to show how these three young trees should be top-pruned to obtain the type of tree herein suggested as suitable to our conditions. The primary step taken in the formation of any given type or shape is the setting of a stem. The first shoot made by any tree, whether it emerges

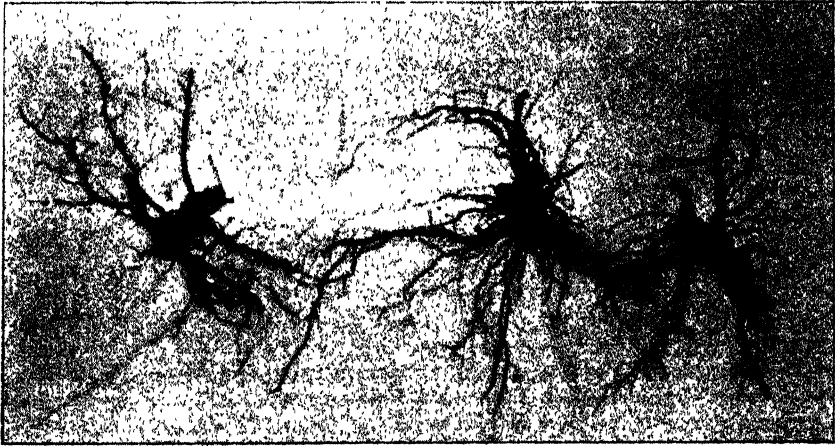


FIG. 1.

FIG. 2.

FIG. 3.

PLATE V.—SHOWING ROOT SYSTEM OF SAME AS RECEIVED FROM THE NURSERY.

as a “virgin” growth from a seed, or from an inserted portion of another plant, such as from a bud or graft, usually grows in a vertical direction. This is the stem of the tree. Along this growth at regular intervals buds are formed, from which branches may arise to form the main arms of the tree. By a law which is generally recognised as applying to all plants that are raised above the surface of the ground on stems, the buds at the topmost point of growth absorb the



FIG. 1.

FIG. 2.

FIG. 3.

PLATE VI.—SHOWING SAME ROOT SYSTEMS PRUNED READY FOR PLANTING.

greatest quantity of nutriment, and consequently, in a state of nature the terminal bud continues to lead until some check is administered to it, and then those next in point of elevation take up the running, with the result that branches are formed. Mankind has taken advantage of this law to turn to good account the opportunity offered for modifying the natural forms and heights of stems assumed by various fruit trees, and confining them to sizes of a uniform character consistent with the needs of orchard economics.

A glance at Plate III. will show the much more uniform growth in the branches sent out by Fig. 1, where they start on almost the same level, than is noted on Fig. 2, where a much greater space intervenes between the lower and higher branches. This is the great advantage Fig. 1 possesses over Fig. 2, and the gain will be more apparent as time goes on and crops of fruit are borne. Some of the disadvantages connected with the methods of pruning adopted in Plate IV. are, with Fig. 1, too many shoots are left, and too many buds are left upon each shoot. These errors will give rise to a great number of comparatively weakly shoots which, in the close struggle for existence, will injure each other and form weakly main arms. These being set closely together, the lateral growths will be choked out of existence, and the fruiting wood driven to the topmost shoots, thus defeating one of the chief aims of the short trunk, viz., keeping the fruit within reach and secure against rough winds, &c.



FIG. 1.

FIG. 2.

FIG. 3.

PLATE VII.—SHOWING SAME TREES WITH BRANCHES
AND ROOTS PRUNED.

In Fig. 2 there are too many shoots left, and these are spread over elevations too varying to ensure maturity to all. The result would be that many of the limbs would gradually perish or become barren from the lower shoots upwards.

Fig. 3 is typical of many local failures. The tree has begun in the natural course of vegetation to set its main or scaffold branches, and the pruner "doesn't believe in interfering with nature," consequently he allows nearly 3ft. of stem to carry a few weakly twigs. This is the sort of tree that requires much support, even before fruit is borne, to stand against the persuasions of the prevailing winds; and when it reaches maturity—supposing man and the elements have been kindly—it simply sprawls in umbrella fashion in the way of cultivation or yields to the wrecking influence of strong winds.

In Plate VII. the pruning applied by many successful fruitgrowers is shown. In this illustration the stems are set from 15in. to 20in. high.

In the case of Fig. 1 advantage has been taken of the formation of main

arms in the nursery. The check this tree received in the nursery bed illustrates how a season can be gained in shaping the tree by a check being given to the terminal growth during the growing season, but this is only safe and practicable where very vigorous growth is obtainable.

In Fig. 1 three main arms, radiating at regular intervals from, and set fairly distant above each other, along the main stem are selected. Each of these are pruned so that two or three buds only are left to grow.

At this period we are seeking to furnish the tree with a limited number of sturdy main arms, which will be capable of carrying, without injury, heavy weights of fruits and foliage. To attain this end advantage is taken of a self evident rule which teaches that when a tree is in average good health the lesser the number of shoots allowed to grow from any branch the greater will be the strength of each individual shoot.

Fig. 2 is treated in a very similar manner, excepting that four shoots are retained to form the main arms. Whether three, four, or five main arms are best is a matter over which opinions vary, but personally I favor three, for the reason that in the subsequent sub-divisions more room is allowed for the development of lateral fruit-bearing growths.

Fig. 3 shows the tree reduced in length to form a short stout stem. The height of the branching system as started voluntarily has necessitated the reduction of this tree, for all practical purposes, almost to the stage at which Fig. 1 stood when the check caused it to branch, and Fig. 3 in a year hence will be identical with Fig. 1. That is, it will be pruned to fix the number of the main arms along the stem. It is pruned this year to start those arms. There is a distinct advantage in having a clean, healthy, strong whipstick stem on which to begin, and 90 per cent. of our nursery trees could be shaped better if permitted or compelled to take this form when in the nursery bed. The grower can fix the height from the ground at which the main arms shall emerge to suit his peculiar conditions, when the trees received from the nursery are grown thus. In actual practice the pruning of the tops should not be performed prior to the planting of the tree in its permanent position in the orchard, for the reason that the limited number of buds left upon the main stem or the main arms are chosen because they indicate the direction of future growths, and if any of these be damaged the symmetrical growth of the tree will be disturbed, and the balance of the crown upset.

(To be continued.)

ANALYSES OF COMMERCIAL FERTILISERS.

(BY W. L. SUMMERS, INSPECTOR OF FERTILISERS.)

Since December last the warehouses and stores of all the principal importers of and dealers in fertilisers, together with the bonemills and manure works around Adelaide, have been inspected, and samples taken for analysis of most, if not all, the phosphatic manures offered in the colony. The following table shows the results of the Official Analyst's determination of the constituents of the samples taken by the inspectors, the price charged per ton, and the comparative values of the constituents of the respective manures.

In arriving at this comparative value the prices of the manures containing the various constituents have been ascertained, and the unit value of such constituents in each case arrived at from such prices. From these unit values an average of the whole has been taken for purposes of comparison.

It must be clearly understood that this "value" is not intended to represent the actual money value of the fertiliser, which may vary according to local

conditions of supply and demand, and does not take into account any extra expense for handling, as is incurred with complete or partially complete fertilisers. All that is intended is to indicate as nearly as possible a fair average retail price for purposes of comparison.

To arrive at the value of a manure the percentage of each ingredient is multiplied by the unit value attached to such substance, the total being the value per ton of such manure.

The following may be accepted as the average unit values of the under-mentioned constituents:—

In Bonedust—Tricalcic phosphate	1/2
In Bone Super.—Tricalcic phosphate, made soluble	3/2
Tricalcic phosphate, insoluble	1/2
In Guano and Guano Super —Tricalcic phosphate made soluble	2/8
Tricalcic phosphate, insoluble	1/2
In Mineral Super.—Tricalcic phosphate, made soluble	2/8
In Thomas Phosphate—Phosphoric acid	3/9
General—Potash	6/6
Ammonia	10/-

Analyses of Fertilisers.

The following shows results of the Official Analyst's analyses of samples of fertilisers taken by the Inspector:—

		Price per ton.
BONEDUST.		
E. & W. Hackett's "O.K."	49.3 tricalcic phosphate, 4.75 ammonia	£ 5 0 0
Adelaide Chemical Works	47.6 tricalcic phosphate, 5.1 ammonia	5 5 0
L. Mehrtens & Co.	38.2 tricalcic phosphate, 5.1 ammonia	4 10 0
L. Conrad	49.99 tricalcic phosphate, 3.6 ammonia	5 5 0
R. D. Vawser	40.6 tricalcic phosphate, 3.77 ammonia	5 0 0
THOMAS PHOSPHATE.		
Elder, Smith, & Co. —"Bilston" ..	19.9 phosphoric acid	3 5 0
J. G. Ramsay & Co.	19.7 "	3 5 0
F. H. Snow—"Star"	18.1 "	—
S.A. Farmers' Union—"Alberts" ..	18.1 "	3 10 0
Norman & Co —"Leeds"	18.0 "	3 15 0
Clutterbuck Bros.		3 7 6
MINERAL SUPER.		
Adelaide Chemical Works	43.4 soluble phosphate,	4 15 0
S.A. Farmers' Co-operative Union— "Globe," United Alkali Co.	37.65 "	4 15 0
Clutterbuck Bros.—"Ohlendorff's" ..	37.5 "	4 17 6
Elder, Smith, & Co.—"Lawes"	37.1 "	4 7 6
Clutterbuck Bros.—United Alkali Co.	36.6 "	4 17 6
E. & W. Hackett	36.02 "	5 0 0
Australasian Implement Co.—"Lawes"	36.02 "	4 17 6
GUANO.		
A. W. Sandford & Co.—"Kangaroo" ..	50.2 tricalcic phosphate, 0.91 ammonia	2 12 6
E. & W. Hackett	43.2 tricalcic phosphate, 1.36 ammonia	4 0 0
Penguin Guano Co.—"Penguin"	32.3 tricalcic phosphate, 0.87 ammonia	3 5 0
Gibbs, Bright, & Co.—Peruvian guano	19.76 soluble phosphate, 6.04 ammonia, 2.06 potash	14 0 0

<i>Analyses of Fertilisers—continued.</i>		Price per ton.
GUANO SUPER.		£ s. d.
Adelaide Chemical Works	17.46 soluble phosphate, 20.3 insoluble phosphate, 1.53 ammonia	3 15 0
BONE SUPERPHOSPHATES AND MIXED FERTILISERS.		
E. & W. Hackett—Sugar Co., No. 1 Super.	34.3 soluble phosphate,	5 10 0
E. & W. Hackett—Sugar Co., No. 2 Super.	30.1 soluble phosphate, 2.04 ammonia, 1.0 potash	6 10 0
Adelaide Chemical Works—Super.	13.97 soluble phosphate, 20.73 insoluble phosphate, 3.91 ammonia, 0.22 potash	5 15 0
“ “ Super. B.	6.11 soluble phosphate, 33.18 insoluble phosphate, 0.31 ammonia	4 7 6
“ “ Super. C.	20.41 soluble phosphate, 16.62 insoluble phosphate, 1.36 ammonia, 0.23 potash	5 0 0
R. D. Vawser—“Excelsior” Super. ..	16.7 soluble phosphate, 12.8 insoluble phosphate	5 15 0
Rawson's Patent Improved Fertiliser.. (Dalgetty & Co., agents)	5.5 insoluble phosphate, 0.51 ammonia, 1.38 potash	5 5 0

The prices quoted are for single ton lots, except Messrs. Elder, Smith, and Co.'s prices, which are for 5-ton lots; most other vendors make special reductions for 5-ton lots. Prices have, however, risen several shillings per ton for mineral super. since the samples were taken.

In these tables the constituents shown are those by which the fertilisers are usually sold in this colony. The percentage of nitrogen in bones and guano is not usually given, but its equivalent as ammonia. Instead of giving the percentage of phosphoric acid in bonedust, guano, super., &c., the percentage of soluble or insoluble tribasic phosphate of lime is almost invariably guaranteed. The term “insoluble” in the above is scarcely correct, as it only means that the percentages as shown are insoluble in water. Some portion of the so-called insoluble phosphoric acid is in some cases soluble in citrate of ammonia. This is particularly the case with the Adelaide Chemical Works super. and super. B, which the manager states are purposely kept low in water soluble phosphoric acid, but are high in citrate soluble phosphoric acid; in fact, there is only about 1 per cent. of the phosphoric acid really insoluble. In America the citrate soluble phosphoric acid is valued at about 10 per cent less than water soluble, consequently these two fertilisers are actually of higher value than appears at first glance.

FACTS FOR CONSIDERATION BY DAIRY FARMERS.

By G. S. THOMSON, N.D.D.

When there is apparently some evidence that an animal in the herd is tuberculous, the dairyman must not plead that the disease belongs to an unknown category. In Great Britain, over forty years ago, our forefathers had tuberculous stock, but the proportion of milk cows was limited when compared with our vast herds of to-day; the consumption of milk, butter, and cheese was of a trifling consideration as compared with the demands of present life; the

population of healthy people with vigorous constitutions was above the average, and the scientific knowledge of medical and veterinary practitioners was far below the present standard. Nothing was known of bovine tuberculosis, and human "consumption" was only recorded as an incurable and hereditary trouble, carried down from generation to generation through an unexplained affection of the lungs. With a steady and increasing advance in veterinary and medical science we now find ourselves confronted with the confirmed knowledge that tuberculosis in the cow and tuberculosis in the human being is analogous. The destruction of cattle and loss of human lives by a consuming of the lungs and wasting of the body is caused by a small living organism or germ, called the bacillus of tuberculosis. There is no credulity or superstition associated with the fact that the disease is communicable from beast to man and *vice versa*. Let us accept this profound assertion, and unite in a cordial determination to slowly and persistently eradicate the disease. Everything that is being done in other countries is undertaken with a view to reduce the malady, to improve and strengthen the health and vigor of herds by removing affected animals, destroying the advanced in disease, and thus reducing contagious existencies. With such action, confidence with regard to purity of milk is assured, with prevention of danger to the public, and confidence is restored in those who have become alarmed as to the danger of infection from dairy produce. Many persons, were they in a position to do so, would ruthlessly condemn to slaughter all cattle affected or supposed to be affected with tuberculosis. But such indiscriminate condemnation would be altogether unjust, and would entail serious losses. People are apt to over-estimate the prevalence of the disease, and many have fallen into error with regard to the dangers associated with milk, butter, and cheese. The tubercle bacilli are with absolute certainty destroyed by exposure to a little less than boiling heat for three minutes, and there is no reason whatever for abstinence from use of these highly nutritious, wholesome, and agreeable products of the dairy if producers or consumers will only adopt that simple preventive measure. Strong, healthy people are not nearly so susceptible to contract this disease as are those of a weak and unhealthy constitution; but there is no common sense, notwithstanding, for neglect of the simple precaution of scalding the milk before it is consumed at home, or of pasteurising it at the dairy or factory. It is only too true that tuberculosis is present in some of our dairy herds, but it is not safe to merely guess the extent of its prevalence. If the work of effecting a lessening of prevalence of that disease lies in the hands of the dairy farmers, I may venture to submit the following proposals, the adoption of which, if acted upon, will tend to reduce and prevent the spread of tubercular and other diseases:—

I. Sale of Diseased Stock.

It is customary for milk cows suffering from a standing complaint to find their way into the sale yard. The money generally paid is trifling, and the purchaser sustains little loss on the death of the animals should such occur. This is a prolific means of transmitting tuberculosis from one district to another and from farm to farm.

II. Notification to the Inspector of Advanced Case or Cases Arousing Suspicion.

This is not done, but is a serious neglect, entailing loss of life amongst cows, and we might venture to say amongst families also. When an animal displays serious symptoms of disease and partially recovers, finally to slowly pine away, what a bed of contagion such an animal would be to other cows in contact with her, and what a source of danger to milk consumers, especially infants and delicate people. In past years many cows have died of troubles

unknown to the owners; thus carcases have been allowed to decay in the paddocks where they fell, no provision being made for their immediate destruction. When a farmer is unaware that a cow is suffering from the final stage of tuberculosis, but knows that she is unhealthy, he may milk her to the last and yet be innocent of the trouble. When suspicion is first aroused the value of notification is fully demonstrated.

III. Whenever Practicable, Isolation of Suspected Animals and Vigilant Observation Maintained.

Assurance that no milk is sold or separated for cream and butter making, and that neither calves nor pigs are fed upon the milk until the owner is satisfied through reliable authority that the disease is not attended with danger to the milk supply.

IV. Breeding from Profitable Milking Cows with Sound and Strong Constitutions.

To breed from a puny, delicate cow is generally attended with a risk of weakness in the offspring. If the mother is tuberculous the calves in all probability will inherit a predisposition to the disease. There is great necessity for good nourishment in the feeding of calves, to build up a sound constitution, with a degree of immunity against contagious maladies. Tuberculous milk is freed from danger after scalding, and if given to pigs it must be so treated. The health and vigor of bulls is worthy of careful consideration. Raising the standard of the dairy herd, with attention to feeding, will ward off many a death and sickly cow on the dairy farm.

V. The Necessity for Shelter.

On how many farms is suitable shelter provided for milking stock? Attention to this point is completely overlooked. Consider the nature of the weather experienced during the middle of the past month, when the average temperature in the shade was close on 100° F., and lasting for a week. This was followed by a cold, wet, and stormy change, with thermometric readings under 60°. Without provision being made for such extremes exposure cannot fail to leave its mark on the future health of the less robust animal. Our climate, along with present inattention to shelter, is worse than the climate housing in Great Britain; hence our cows are not only made subject to tubercular and other diseases, but the milk supply permanently suffers. "Prevention is better than cure."

VI. Cleanliness in all Work Associated with the Milking of Cows and Complete Sterilisation of Milking Utensils.

Much room exists for improvement in and around the milking stances for cows. At the cost of a little labor a great deal could be done in the way of removing a source of danger by cleanliness of the immediate surroundings and occasional disinfection of the bail.

VII.—Adoption of the Tuberculin Test.

If circumstances would admit of the tuberculin test being put into operation, knowledge would be forthcoming as to the prevalence of tuberculosis; and, more valuable still, all reacting animals would be singled out, kept under supervision, and fattened off with safety if they exhibited no external indication of the disease.

I am writing this article not through a love for the subject, but owing to a number of communications having been received from the general public, and concerning the purity of milk from tubercular germs. Perhaps too much has

already been said about tuberculosis, but unquestionably too little assistance has been given by the owners of stock to check the disease. When the trouble exists it is only making matters worse and will involve greater loss by concealing the knowledge from the Inspector that cows are affected. One must, however, guard against the error of supposing that every sick-looking cow is tuberculous; such is very far from being the case. Many poor and starved-looking cows are healthier in their organs than the fat and attractive animals, but when the malady is marked some external indications are observable. Now that we are aware of what is before us it is to be earnestly hoped that (without applying or having applied rash means of coping with the disease) tuberculosis in cows will soon become a thing of the past.

Separator Slime.

One of the guinea pigs experimented upon with food containing separator slime has already died. Upon examination the lungs were found diseased; also heart, and more so the intestines. Those working separators in the farm, factory, or creamery will have to be very particular, and see that the slime is not permitted to be thrown into pig yards or allowed to be mixed with the skim milk for pig-feeding.

FARM NOTES.

BY W. LOWRIE, M.A., B.Sc., PRINCIPAL AGRICULTURAL COLLEGE,
ROSEWORTHY, SOUTH AUSTRALIA.

Seedtime.

Fallows are this year generally in good condition, as rains have fallen at intervals during the last three months, and most districts have been favored with one or other of the falls. On the College farm we had for the month of January, 1·63in., for February, 1·79in., and for March, 0·47in., and accordingly stubbles have been ploughed up where the land is to be cropped with wheat after wheat, and fallows have been worked with advantage. When dry conditions prevail I question whether anything is gained by working fallows during these months, when the land is free from stinkwort and clean, but after rains a turn of the scarifier is of much advantage. In the one case the fallow may be worked into mere dead dust, but in the other it is mellowed and tilled.

Conditions so far promise a favorable seeding. We have not yet had on this farm sufficient rain to enable us to start sowing right away; as things are there would be danger of having an unsatisfactory germination of the seed. But in districts where sufficient rain has fallen farmers are busy sowing, and the chances of success are in their favor who get going early. It may happen that a prolonged dry spell after the plant has braired may work mischief, but fallows in these districts are in such good condition that the young plant may fairly be expected to go on for a month unchecked, and if rains do come in time the gain from this early start will be most marked. On the light land of the College farm sowing before the rains come and before the land has been well soaked so that it will work well, is to be abhorred, for the crop is unhealthy, liable to take all and more subject to other ills throughout the period of its life, but had we had at the beginning of April 1in. or 1·25in. of rain I would proceed with the sowing right away. It is well, when beginning early in the month, to sow the latest wheats intended to be grown first; a start should be made with such wheats as Defiance, Tuscan, Leak's, and Purple Straw, while wheats, such as Early Para, Allora, Baart, and King's should be held back for later sowing. In this district, at all events, I am satisfied that the last week

of April and first week of May is sufficiently early for these earlier wheats. Sown earlier these wheats are liable to become "proud," and even if they go on all right through the winter are liable to loss from spring frosts occurring while they are in bloom.

The careful selection and preparation of seed wheat is most important, and attention to these matters is always well repaid. The following are some of the considerations to be taken account of:—

1. Selection of variety suitable to the district. Wheats suitable for the Hills districts and for the South-East are not, generally speaking, most suitable for the mallee lands or for the Northern Areas. No doubt there are certain well-known wheats that are grown from end to end of this colony—Purple Straw is an example of such; nevertheless, it will be found advisable to select in every district some wheats specially adapted to its conditions. For those districts situated in the Hills, with a good rainfall and a late spring, I believe late wheats, if sown sufficiently early, will return the heaviest yields. But it is important that they be sown early, and that the land be clean, as these wheats creep and keep low on the ground for the first few months of their growth, and if the land be foul the weeds get too good a start and handicap the crop.

Among the Hills and in the South-East of the colony I think wheats such as Victoria, Odessa, and Blount's Lambrigg, if sown sufficiently early, would be likely to return heavier yields than those now reaped from Tuscan, Leak's, and Purple Straw. In some parts of England there is a worthy saying that the new wheat should be through the ground in time to see the old wheat carried home to the stack. That, of course, is not possible in South Australia, though I think the saying should be interpreted by us to mean that our wheat should be in the ground as long as possible. Rightly or wrongly, I have the impression that the farmers north of Adelaide have been more successful in selecting wheats suitable to their conditions than have those in the better districts south of Adelaide. Early wheats are popular in the North, and rightly so I believe, and accordingly wheats such as Early Para, Allora, King's, and Baart have found much favor.

2. The soil has to be considered as well as the climate. Some wheats, such as Baart, yield well on limestone soils of lighter character, but do not compare favorably with Purple Straw, Leak's, or Early Para on stronger heavier lands, and accordingly in the selection of a variety of seed wheat it is necessary for each farmer to note from comparative trials the wheats best suited to his particular soil; it is not sufficient to follow the prevailing opinion of the district.

3. When satisfied as to varieties best suited it is necessary further to secure good samples of each of these varieties—(a) That the samples must be clean goes without saying; (b) the heaviest grains should be selected. Seed wheat should always be graded, and shrivelled grains eliminated. That shrivelled grain will grow into as good a crop as well-filled heavy grains was rightly described by Dr Cobb, of New South Wales, as a hoary fallacy. Both the *blower* and the *grading screen* should be used in the preparation of seed wheat. We have it on very old authority that

The largest seeds, tho' viewed with care,
Degenerate unless th' industrious hand
Doth yearly cull the finest.

And no farmer doubts it. When it is desired to work up a pedigree wheat the method adopted by Major Hallett in improving the wheat known as Hallett's Pedigree wheat has much to recommend it. He gathered from the growing crop a healthy vigorous plant, with long, well-filled ears, and sowed therefrom the best grains. From the plot so obtained he again selected the plant or plants coming nearest his ideal, sowed the grain; and so on year

after year. The methodical selection of the best plants all round from the growing crop and the sowing of the grain as a stud plot has much to recommend it, and I would look to this method as likely to give better results than the practice of cross-breeding. The average farmer has, however, little opportunity to carry on such work to much advantage, but he can readily adopt the mechanical means—blower and grader—of improving his seed sample, and it will pay well to adopt it. To go to the miller and purchase seed wheat with no fair guarantee of purity is folly in the extreme.

I would point out, however, that it may be a mistake to purchase wheat for seed which has been grown under the most favorable conditions possible, and because it is to the eye a bright, pleasing sample. Such wheat may be pampered and delicate and give disappointing results.

4. Change of seed is an important means of maintaining the vitality of any variety of wheat. I believe it well to follow in this matter with vegetable life what has been found good in relation to animal life: to avoid change from a very rich district to one naturally very poor. At the same time I would mention that the hypothesis has been advanced that certain soils and situations can establish a kind of hereditary influence in seed capable of withstanding less favorable local influences for two or three seasons, though I doubt whether it will be fully demonstrated.

5. Attention should be given in the selection of seed wheat to such matters as—(1) Tendency to rust or liability to loss from this disease. Early wheats, such as Early Para, will often escape when a later wheat, like Purple Straw, will succumb. Some wheats, such as Defiance, Ward's Prolific, and Leak's, and flinty wheats such as Belatourka and Medeah, are more or less rust resistant. I have never yet seen flinty wheats suffer appreciably from rust. It is well therefore to have part of one's wheat area sown with some variety for which the risk is less. (2) Tendency to lodge. Allora will go down when Early Para will stand well; Baart and King's are a little weak-kneed, and should not be sown therefore on ground very rich in organic matter. (3) Tendency to shake out. Steinwedel, Baroota Wonder, and Smart's are prominent sinners in this respect.

6. All seed wheat should be pickled. To have bunt on one's crop is evidence of carelessness. In my notes for April last year this matter was dealt with, and a solution of bluestone of from 1 per cent. to 1·5 per cent., or even 2 per cent., was recommended. This is better than the common formula, $\frac{1}{4}$ lb. of bluestone to the bag, as being more definite.

It may be mentioned in conclusion that the mixing of several varieties of wheat, provided their times of ripening are not too far apart, for hay is good practice, and will secure heavier yields.

WEATHER AND CROP REPORTS.

ARDEN VALE.—Over an inch of rain recorded for February. It is again threatening and a good fall is hoped for, as rain in March augurs well for the coming season. Farmers are busy ploughing, and seeding will be general about the beginning of April.

BALAKLAVA.—0·75in. of rain since last report; this has started farmers to work on fallows. In the scrub summer ploughing is well forward, and some have commenced seeding, but this will not be general until we get a good soaking, which those who are out of water would like to experience at an early date.

CAWLER RIVER.—The February rains, over 1·50in., caused the feed to spring nicely, and in the stubble the wheat and oats are high enough to give stock a nibble. On bare places and where hay has been cut it is going back a little, but about $\frac{1}{2}$ in. of rain would save it. Commercial fertilisers will be used on a larger area than last season, some of which will be drilled in before seeding, as this system gave good results last year. Stock in good condition. A good deal of straw and chaff have been saved for winter use. Summer crops almost a failure, except where irrigated.

INKERMAN.—The weather during the month has been seasonable; a few light showers have fallen.

KAPUNDA.—Rainfall for February, 1·33in. Nothing special to report.

LUCINDALE.—Fine rain fell early in the month, with occasional showers since, and early feed is assured. Early-sown green feed is already showing above ground. Stock are looking well. Orchard crops yielding satisfactorily. There is a little spot (bitter pit?) showing in apples, especially Cleopatras.

MOUNT BRYAN.—Good rains fell the end of last month, in fact the heaviest for several years, filling all dams and starting the feed. Weather is again hot, but a little rain would assure good feed for the winter.

MOUNT COMPASS.—Rainfall for month 1·16in. Potato digging is in full swing.

MOUNT REMARKABLE.—On February 25 over 1½in. of rain fell, extending well eastward. All dams were filled and feed started, but the hot weather since has materially checked the growth of the young grass, some of it even going off. Many farmers have commenced seeding since the rain.

NANTAWAKKA.—The weather during month has been seasonable, but farmers are looking for a good downpour to start the rubbish so that they may commence work on the fallow. Stock keeping in good condition; on most farms straw stacks and cocky chaff are available for feed, which will make a good difference to stock not working. Rainfall 1·22in.

PINE FOREST.—Many farmers have commenced ploughing dry land, and others have started seeding with the drills, a large number of which are being used here this year. Weather continues dry and warm, and a good rain would be welcome. Stock generally in good condition, although good water is very scarce.

PYAR.—Seeding has commenced. Rainfall to date nearly 2in. Stock healthy, but wild dogs troublesome amongst sheep.

SADDLEWORTH.—The rain at the end of February, while injuring the dry feed and stubbles, helped the sorghum; this fodder has grown well since and is being cut for dairy cows, for silage, and fed down by sheep on fallow to be followed by wheat. Ploughing for present cropping and for fallow has started. Practically no rain since that referred to above in February.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

March 30, 1899.

Although the past month cannot, like the two preceding, claim to have put up records, it has certainly been the most favorable March for a number of years, the season opening at least very propitiously for farming operations. A couple of monsoonal depressions about a fortnight apart gave general rains throughout the settled districts, and farmers are now in full swing preparing their seed beds. Dams and tanks have been filled, and feed owing to the genial weather that has prevailed, is coming along splendidly, with every probability of attaining such strength that no trouble need be apprehended from the usual winter frosts.

Wheat values in the colonies have been ruling relatively higher than in Europe, the price there during the month receding about 1s. 6d. per quarter, whilst rates here more than maintained. Owing to the necessity for fulfilling freight contracts, shippers were compelled to offer an advance to secure their requirements, whilst in Victoria up to 1½d above equivalent London rates had to be paid by some exporters to fill up orders. No alteration has occurred in flour. Local bakers are operating only for immediate wants, and a little trade is being done in New South Wales and Queensland, buyers taking the opportunity of the low freights usual at this season to stock their requirements of Adelaide flour, but the trade is not sufficient to influence prices here. Millers' offal lines have experienced good business. Stocks of feeding grains are becoming centred, so that values are at least nominally firmer. Some export orders for chaff have been executed, but demand is not heavy enough to raise quotations in this market to any extent.

As the season advances it is evident that the crop of potatoes in the South-East will not be sufficient to carry through; values at Mount Gambier therefore are hardening, and an improvement of 6s per ton has been established this week. It is reckoned that a few hundred tons are still held by growers in the Hills districts south of Adelaide, but this cannot cause any reduction in price, as holders are impressed with the opinion that values later must improve. In onions the plains crop has been exhausted, and the market is now relying on the hills and South-Eastern samples, which, being in few hands, are likely to see higher rates.

Dairy produce lines have during the month attracted considerable attention. The shortage in local supplies of butter led to increasing importations of both butter and cream from Victoria, but, as a result of the favorable growing conditions in this colony, local supplies have again started to improve, and during the coming month we should have a larger production—at least sufficient for local requirements; meanwhile values have hardened. Eggs at this time of the year as a rule steadily advance, but this season, after improving during the early part of the

month, values have within the last ten days eased back about 2d. per dozen, the cause assigned being the West Australian labor difficulty, which is interfering seriously with business towards that colony. Bacon and cheese have experienced brisk trade. Honey somewhat slow. Beeswax finding ready sale, but a shade lower in value. The general impression is that the almond crop will be short; buyers therefore are operating freely. Although the price of poultry is considerably lower than rates ruling for preceding twelve months, the value of trade done in the line during the past month has been much above average, the more moderate prices ruling having greatly stimulated demand, and if present rates maintain they must prove satisfactory both to poultry feeders and consumers.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, 2s. 6½d.; outports, 2s. 4d. to 2s. 5d. per bushel of 60lbs.
 Flour.—City brands, to £6 10s.; country, £6 to £6 5s. per ton of 2,000lbs.
 Bran.—7½d.; pollard, 8d. to 8½d. per bushel of 20lbs.
 Oats.—Local Algerian, 1s. 5d. to 1s. 7d.; good stout white, to 2s. 3d. to 2s. 9d. per bushel of 40lbs.
 Barley.—Malting, 2s. 6d. to 3s. 4d.; Cape, 1s. 9d. to 2s. per bushel of 50lbs.
 Chaff.—£2 15s. to £3 per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.
 Potatoes.—Local, £4; Mount Gambiers, £3 17s. 6d. to £4 per 2,240lbs.
 Onions.—£4 per 2,240lbs.
 Butter.—Creamery and factory prints, 1s. 1d. to 1s. 5d.; dairy and collectors' lines, 9d. to 1s. per pound.
 Cheese.—S.A. Factory, large to loaf, 5d. to 6½d. per pound.
 Bacon.—Factory-cured sides, 7d. to 7½d.; farm lots, 6d. to 6½d. per pound.
 Hams.—S.A. factory, scarce, 7½d. to 9d. per pound.
 Eggs—Loose, 10d.; in casks, f.o.b., 1s. per dozen.
 Lard.—In bladders, 6d.; tins, 5d. per pound.
 Honey.—2d. for best extracted, in 60lb. tins; beeswax, 11d. per pound.
 Almonds.—Soft shells, 4d.; kernels, 9½d. per pound.
 Gum.—Best clear wattle, 1½d. per pound.
 Poultry.—Fair to good roosters, 1s. to 1s. 4d.; medium, 9d. to 11d.; fair hens, 9d. to 11d.; ducks, 1s. 6d. to 2s.; geese, 2s. to 2s. 6d.; pigeons, 6d. to 7d.; turkeys, 4d. to 5½d. per pound live weight, for fair to prime table birds.

THOMAS PHOSPHATE.—Although its action on some soils is more favorable than on others, generally speaking the phosphoric acid in Thomas phosphate is *half as valuable* as that in soluble phosphates. It will have most effect on soils of a peaty nature, poor in lime, but rich in organic matter. On pasture land of not too dry a character and clay soils poor in lime it has a very favorable effect. The various leguminous crops appear to reap most benefit from this fertiliser. It must not be mixed with sulphate of ammonia, as the free lime it contains will set free and cause the loss of a considerable quantity of ammonia. With nitrate of soda and potash salts it may be freely mixed, but this should be done just before it is applied to the land, otherwise lumps will form and set hard. It is one of the best fertilisers for turnips. Experiments conducted by Professor Wagner proved that much depends upon the fineness to which the slag is ground. Finely-ground Thomas phosphate is four times as active as coarse slag.

THE ACTION OF LIME.—We may sum up in a single paragraph the different ways in which lime acts. Its action is mechanical, chemical, and biological. It acts on the texture of the soil, rendering clay soils more friable, and exerts a certain binding effect on loose soils. It decomposes minerals in the soil containing potash and other food constituents, and renders them available for the plant's needs. It further decomposes organic matter, and promotes the important process of nitrification. It increases the power of a soil to fix such valuable food constituents as ammonia and potash. It neutralises sourness, and prevents the formation of poisonous compounds in the soil. It increases the capillary condition of the soil, prevents fungoid diseases, and promotes the growth of the more nutritive herbage in pasture land.

BRANCH SHOW AT CHERRY GARDENS.

On Thursday, March 16, a very good show was held in the Rechabite Hall, under the management of the local Branch of the Agricultural Bureau. The Hon. A. W. Sandford opened the show with a short speech, in which he spoke hopefully of the prospects of very large exports of horticultural and dairy products from an area of twenty miles around the locality. The show consisted chiefly of groups of products of the "Farm and Dairy," "Orchard and Garden," and "Home Industries," in each of which there was good competition with excellent products and manufactures. The entries of bottled and dried fruits, pickles, sauces, jams, jellies, &c., were excellent, and most of the fruit was of the highest quality. Some Red Kaffir corn was about 10ft. long. The exhibits of fodder plants of all kinds were exceptionally large. Altogether the show was a decided success. A feature of the shows held by this Branch is the award, as prizes, of handsomely framed colored pictures, with inscription showing for what worthy exhibit they are given. The following is the prize list:—

Farm and dairy, J. Lewis, C. Lewis; orchard, C and J. Lewis, S. Chapman; home industries, Mrs. T. Jacobs, Mrs. R. Brumby; garden, C. Ricks, H. Strange; butter, Mrs. W. Nicholl, J. Brierly; collection of vegetables, T. Ricks (two); do., boys under 12, Arnold Jacobs, T. Lewis, H. Lewis; onions, Arnold Jacobs (three); guni, U. Jacobs, G. Ricks; needlework, M. Jacobs, S. Dall, E. Brumby. Special prizes were given for tubers, butter, onions, collection of fodder plants, loaves of bread, export apples, and vegetables.

CONFERENCE OF SOUTHERN BRANCHES.

A Conference of Southern Branches of the Agricultural Bureau of Agriculture was held at Strathalbyn on Friday, March 24.

Members Present.

From Clarendon Branch: Messrs. J. Spencer, J. Wright, A. L. Morphet, and R. Hilton. Meadows: Mr. W. A. Stone. Strathalbyn: Messrs. M. Rankine, B. Smith, W. J. Tucker, G. Sissons, D. Gooch, R. Watt, M. W. Rankine, L. Dunn, D. Rankine, and J. Cheriton. Mylor: Mr. W. H. Hughes. Woodside: Messrs. R. Caldwell and M. Schraeder. Kanmantoo: Messrs. J. Downing and W. J. Mills. Mount Compass: Mr. M. Jacobs. There were also a number of visitors, including several ladies. The General Secretary and Inspector of Fruit were also present, representing Central Bureau.

Exhibits.

Mr. MacMillan, of Yankalilla Branch, sent in a plant of Marram grass, about 2ft. high, which has proved very effective with him, as well as by many others in various parts, in arresting drift sands. Mrs. W. J. Stone, of Meadows, exhibited a splendid trophy of jams, jellies, pickles, bottled fruits, dried fruits, fresh fruits, flowers, &c., amongst which was a sample of excellent apple jelly, made entirely by her little daughter, only 6 years old. Mr. G. Sissons, Strathalbyn, staged a nice lot of apples; some very large walnuts, not yet ripe; and a specially nice, well-marked watermelon. Mr. M. Rankine staged a great variety of apples, all well grown, plums, tomatoes, and an immense vegetable marrow. Mr. W. J. Tucker, of Sandergrove, tabled some fine bunches of Red Prince grapes, and several varieties of well-grown tomatoes, including the large Ponderosa. Mr. W. Brooks, Strathalbyn Branch, showed African Baart wheat, and some good barley, unnamed.

Proceedings.

Mr. JOHN CHERITON, Hon. Secretary of Strathalbyn Branch, was voted to the chair, and opened proceedings with a vigorous protest against the slowness of some of the Hon. Secretaries of Branches in replying to communications respecting the Conference, and spoke of the neglect and want of courtesy in some other persons, who in some cases did not even acknowledge receipt of letters, and in other instances promised to attend and read papers, or do something to aid in the proceedings of the day, but were not present, did not forward the promised papers, or exhibits, &c., nor had they even sent messages or letters explaining their absence and neglect. He had written to twenty-one Branch Hon. Secretaries, and for some time only two had replied, but later on he had received nineteen replies; two others took no notice whatever of his communications, and nineteen promised to be represented at the Conference. Of those nineteen promises only seven had been that day fulfilled, and of the rest only one had the courtesy to write or send message explaining cause of absence.

The GENERAL SECRETARY deeply sympathised with Mr. Cheriton, considered he had been badly treated, and thought that the neglectful ones deserved severe censure.

The CHAIRMAN requested the General Secretary to read the following in the absence of the author (Mr. F. E. H. Krichauff):—

Essentials in Beef Production.

Professor C. F. Curtis, M.S.A., says—"As there is a dairy type, there is also a beef type, and the latter is less variable. Yet many cows combine milk and beef to a profitable degree; but a good carcass of beef from a steer of a pronounced dairy type or breed is rarely seen."

Broad well-covered backs and ribs are absolutely necessary to a good carcass of beef, and no other excellencies, however great, will compensate for the lack of these essentials. Thickness in these parts requires both breed and feed. The distinction between cattle of different types is absolutely essential to profitable feeding. There is not a very great difference in the rate of gain, or the number of pounds of increase in weight from a given amount of feed, that will be made by a representative of the best beef breeds, or by a genuine scrub, a Jersey, or a Holstein steer. The Jersey is a breed that has been developed for centuries for the specific purpose of making butter, that is, putting the product of its feed into the milk pail. They are rough, angular, bony, and when fattened, they do not put the fat into the tissues of the high-price cuts of steaks and roasts on their backs, as representatives of the beef breeds do. A Jersey steer had 190lbs. of what is termed loose, or internal tallow, and 55lbs. of suet on a 763lb. carcass, or 32.1 per cent. of it was tallow. It had dressed only 57.5 per cent. of beef, while a Hereford (dressed 67.5 per cent.) had only 95lbs. of tallow and 38lbs. of suet on a carcass of 888lbs., so that its equivalent was only 15 per cent. of tallow. The Jersey steer went on accumulating fat around his paunch and internal organs to nearly one-third of his entire body's weight, and did not make meat enough on his back to decently cover his bones. Both the Jersey and the Hereford made practically the same gains in the feeding, and at substantially the same cost per pound for the feed consumed; but the market revealed the fact that the steer of the beef type and inherited beef-making capacity was making a product worth 49 per cent. more than the Jersey, and this determined profit or loss. It is the same with a pure-bred Holstein. Any amount of good feeding will never put any but scanty flesh on the back, and that of inferior quality, owing to the absence of that fat deposited throughout the tissues of the meat that is so necessary to a ripe, juicy, and highly-flavored cut. With our scrubby lot, of no breed, or all breeds, it is doubtless generally the same in a greater or lesser degree, according to their descent. And most of our larger squatters are fully aware of the importance of keeping either a dairy or a beef type, and no mongrels. But are our farmers aware of the above? Of course they may make a dairy cow fit for the butcher, and thus believe that they make a profit on the old cow; but, if they hold the opinion that it pays to keep the steers from a dairy breed, they are mistaken. It is best to sell them as calves.

Early maturity and the weight are other important considerations. In England, during May and June, even 1,400lbs. is a little too heavy. During the other ten months, cattle should not weigh more than 1,500lbs. It is a well-established principle in animal nutrition that young animals do not require the amount of feed for a given gain that older animals will want advancing towards maturity. Calves under three weeks of age increased 1lb. in live weight for each pound of dry matter in the feed consumed; that is, when receiving 17.6lbs. of milk daily,

with 3·9lbs. of cream added. Prof. Curtis fed calves from one week old for ninety days, and obtained an increase of 1lb. in live weight from each 1·97lbs. of dry matter in the feed consumed. They received separator skim milk, with corn, oats, and oil meal, and a moderate allowance of hay. Compared with this, it required during the first eight months 4·6lbs. of dry feed for a pound of gain; for the first seventeen months, 5·97lbs. of feed for a pound of gain; for a period of two years, 7·19lbs.; and for four months more, 9·02lbs. Five other steers, finished for market at the age of thirty-two months, required 10·4lbs. for a pound of gain at such age. Lawes and Gilbert indicate an average of 11lbs. of feed for every pound of gain on cattle approaching maturity. Where lands are cheap, and grazing and coarse fodder abundant, it may be more profitable to take more time for finishing animals for the block, and thus secure greater weight, with the minimum amount of grain or better food to top them, if at all found necessary. And that there is a necessity of coarse food, especially hay for calves after some months, is well shown by experiments made by Director E. Davenport, in Bulletin No. 46, U.S. Some calves, after consuming abnormal quantities of milk, oilcake, and grain, never ruminated, and very nearly died; but, on receiving hay, they soon recovered, and contentedly ruminated. Without such coarse food there was slow starvation and a total absence of fat.

A short discussion followed, much of which consisted of explanations of points which had been misunderstood by some of the audience. Nearly every speaker agreed with the ideas set forth in the paper.

The Permanent Farmers' Relief Fund.

Mr. ROBERT CALDWELL, M.P., Chairman of Woodside Branch, read the following:—

The few remarks about to be made owe their appearance to a circular recently issued by the Agricultural Bureau of South Australia, and bearing the signature of our much-respected General Secretary. This circular has been placed in the hands of all the Branches of the Agricultural Bureau, and has probably ere this received the consideration of several hundred level-headed men. The circular informs us that a meeting of representatives of the Central Agricultural Bureau and the present Drought Distressed Farmers' Fund adopted the following resolution:—

"That the joint committee believes that a permanent farmers' relief fund is desirable, and that the administration of such a fund should be central, and on the basis of the present Drought Distressed Farmers' Fund."

A second resolution provides for the appointment of a provisional committee of large-hearted men to give effect to the idea contained in the first resolution. A third resolution is to the effect—

"That all Branches of the Agricultural Bureau be requested to at once submit suggestions to the provisional committee through the Agricultural Bureau, and begin to collect funds in either kind or money for the above proposed permanent farmers' relief fund."

Had this circular not been placed in my hands as chairman of one of the branches of the Agricultural Bureau I certainly would have refrained from expressing an opinion respecting the proposal contained therein for several reasons, the more important of which was that the consideration of such questions involved politics, which it is not the policy of the Bureau to discuss. But as we and all the Branches are requested to at once submit suggestions to the provisional committee through the Central Bureau, I take this opportunity of giving my reasons why the proposal should not be adopted. Let me here say that I appreciate the difficulties of the situation. That there has been, and is still, great distress amongst the agriculturists of this colony cannot be denied. Neither can it be denied that the distress is likely to continue under existing conditions, and it is also very evident that the agriculturists are not the only sufferers, as the great loss of stock experienced during the last seven years and the shrinkage in revenue, figures unfortunately prove. The loss of sheep alone during the last four years is said to amount to 2,750,000, or more than a third of the entire flock of the colony. In dealing with such calamitous years as the producers of this colony have been overtaken by, the causes that have been operating are entitled to careful consideration. We should ascertain, in the first place, whether the conditions have been of an exceptional character; if not, whether anything can be done to mitigate their operations, and whether the scheme submitted for the organisation of a permanent farmers' relief fund is the only scheme, or the best scheme that can be adopted.

I am one of those who entertain the belief that the conditions, so far as the seasons are concerned, have not been of a very exceptional character. There is, at any rate, no warrant to expect any great change in climatic conditions or rainfall during the next seven years. Yes, one might say, during the next twenty one years. Neither climate nor rainfall is affected to any appreciable degree by legislation, although the denudations of the natural covering of the surface, as pointed out by me in a paper read before the last Congress, held in this place, may have had something to do in bringing about an alteration in the character or effects of the seasons that we have of late years experienced. Mr. Russell, the Government

Astronomer for New South Wales, quite recently reported that the destruction of forests had not resulted in a decrease of the rainfall of that colony. The figures collated by him rather tend to prove that there has been an increase. He is reported to have said that "Droughts in the colony of New South Wales have not been so numerous or severe during the past ten years as they have been in other periods." There is no reason why experience in the other colonies should point to a different result. The conclusion is thus forced upon us that if distress has been brought upon the farmers by drought the conditions that caused the drought are still likely to operate, as they appear conformable with the geographical position of the great island. No alteration or improvement we need therefore hope to see brought about in the climate or rainfall of our section of Australia within a reasonable limit of time. Certain districts are more subject to periodic droughts and uncertain rainfall than others. These districts are now well known; in fact, the late Surveyor-General (Mr. Goyder) mapped them out more than twenty-five years ago. Still there were many who insisted on these very districts being made available for the farmer, under the impression that rain was going to follow the plough. In short, the position is this—farmers are now in the occupation of country on which the ruling conditions of nature are other than favorable to them, and if it is intended to keep them there the organisation of a permanent farmers' relief fund is a positive necessity. But no matter what relief may be given, no man or class of men have long survived under adverse conditions. According to my judgment, the wiser course would be to encourage them to abandon their holdings by offering them land at a nominal rental where the conditions are more favorable, if it can be obtained; if not, to assist them to remove to some other part of Australia, where the necessities of life will be less difficult to command. I am quite conscious of what the suggestion involves. No one likes to abandon a position that has been taken up. No matter how poor the holding may be, or how valueless the improvements, every day's work done on a place helps to root the settler and his family to the land. This sentiment is finely expressed in Dr. Goldsmith's "Traveller" and "Deserted Village," particularly the former, where he thus speaks of the patriotism of the Swiss peasant:—

"Dear is that shed which with his soul conforms,
And dear that hill that lifts him to the storms;
And as a child, when searing sounds molest,
Clings close and closer to its mother's breast,
So the loud torrent and the whirlwind's roar,
But bind him to his native hills the more."

It is a difficult matter to induce settlers to abandon country and beat a retreat from positions that they themselves have elected to occupy. But to help keep them there when the conditions of nature are against them is not for their ultimate good, or in the best interests of the general community. It may seem cruel to make such a statement; it often seems cruel to amputate a limb or an arm, but lives of usefulness have thus been saved. To help keep people in a position where they cannot obtain a living by natural means is mistaken kindness. I am well aware that certain causes of late years have been making against farmers, even in reliable country. The field has lost its energy under ordinary cultivation, and the value of produce of every description has on the whole greatly depreciated. But the establishment of a permanent farmers' relief fund is not intended to provide help for those who are suffering from such causes. The most humane-dispositioned would scarcely care to accept such responsibility. The trouble proposed to be dealt with is that resulting from the occupation of doubtful country—country subject to the visitation of periodic droughts. I had no time to work out the average wheat yield on such country resulting from operations extending over a number of years, but I have heard it asserted that the average yield on not a few of these doubtful hundreds was nearly as high as the yield that has been obtained from areas situated in the mid north. Such may be the case, though I am rather doubtful. But if it is, no better argument can be advanced against the proposal. Everybody knows that people who go upon outside country to seek a living have to put up with many inconveniences, and often struggle with adverse conditions and circumstances other than favorable. The men who go upon such country are generally brave, and the women who accompany them are blest with more than an ordinary share of courage and patience. As a rule, the only consideration they expect is a low rental and easy conditions of tenure. Such consideration has not always been shown, but of late years misfortune has demonstrated the unwisdom of previous practice, and slowly the makers and administrators of law having to do with the occupation of land are coming to a better knowledge of what is required. And yet there is no getting away from the fact that land is still occupied on which the original inhabitants would have starved. Arrangements are, however, being made that may result in the growth of the large holding, but will certainly also result in a more permanent settlement.

If people are left alone on doubtful country experience will soon make them aware of their duty. Nature, after all, is the best teacher, and though an apparent severity may characterise her dealings with the children of men, final results show that her disposition is most kindly,

and her method cannot be improved. And let it be remembered that the South Australian farmer is not the subject of exceptional treatment. The pastoralist and the horticulturist are operated on by the same set of laws. Only the other day, while in the office of the Commissioner of Crown Lands, I observed a number of dockets on the table, representing business requiring attention. The Commissioner held one up, remarking, "This represents arrears of rent amounting to £2,000, which will have to stand over, or the country will be abandoned." It was a pastoral holding. All landlords are not so charitably dispositioned. And every year brings it cases of hardship to some unfortunate producer in the garden, on the farm, or on the run. There always will be those who stand in need of help. Longfellow well remarked—

"Somewhere at every hour,
The watchman on the tower
Looks forth and sees the fleet
Approach of hurrying feet,
Of messengers who bear
The tidings of despair."

The question is how can we best provide against the evil day? According to my judgment, not by the establishment of the proposed fund. And for several reasons, the principal of which are the fact that farmers are not the only sufferers, neither are they the worst; and if we prepare to help the unfortunate producer of grain we should render similar assistance to the producers of vegetables, fruit, and wool. Such responsibility no one has yet proposed to accept. The order would be found rather large. Where assistance is needed it should be given; and I am hopeful that when the principles of co-operation are more generally applied the claims on public sympathy or charity will be less pressing than they have been in the past. Many important adjustments will yet have to be made before our farmers attain to the sound position that we would like to see them occupying. These adjustments may be left to the process of evolutionary law, which is certainly working. In older countries experience has shown the wisdom of non-interference, except in the direction of the relaxation of oppressive conditions. If the galling yoke can be eased, or the heavy burden lightened, such relief should be given, but no central committee for dispensing the small charities that are expected to be gathered from a wide and unreliable surface can possibly do justice to our needy producers. It will be better to teach them to foster those habits of thrift and independence which have characterised many of their predecessors, and are likely to do more for them than any central committee need be expected to do. Neither do I think it all creditable to the colony, however creditable it may be to the hearts of the proposers, to propose the establishment of a permanent farmers' relief fund. I am hopeful that the day is not far distant when, through obtaining a better knowledge of the soil and climate of this province and by the adoption of a different system of agriculture, we will regain our position as profitable farmers and wheat-growers, and that South Australia will be known and noted as the land that produces the finest grain in the world. Indications of improvement are not wanting, and at such a time I consider it would be most unwise to pauperise the manly dispositions of our farmers and discredit the capacity of our adopted country by the establishment of a permanent farmers' relief fund.

At the conclusion of above, Mr. CALDWELL moved:—

That, in the opinion of this Conference, the establishment of a Permanent Farmers' Relief Fund, as proposed in the circular emanating from the Central Bureau, should not be proceeded with.

Mr. JOHN DOWNING, Kanmantoo Branch, seconded the proposition. Several speakers supported the proposition upon the grounds that such a fund would only prolong the trouble in certain arid districts which ought never to have been taken up for general farming purposes, where it was well known that the average rainfall was not nearly sufficient, and where it had been proved by a Government experimental farm, conducted for several years, that the usual farm crops could not profitably be raised. The Government of that time had been induced by popular clamour to yield to the wishes of men who wanted to settle on that land. Experience, till now, had confirmed the conclusion previously arrived at, and hence the continued appeal to the Government and the public for assistance and relief, to enable those unfortunate people to remain on the land. It would be more merciful to find them homes in a more favored part of the colony. In many cases the people would hang on to their holdings as long as they could get help from outside; there were some who would accept "whatever was given" even though not positively in need; and there were some who were too proud and independent to ask for or to accept the aid provided for them by a charitable and sympathetic public.

Mr. JACOBS, Mount Compass, said something ought to be done for present relief, as some of the farmers in the drought-stricken districts were literally starving; and, until something better can be provided for employment of their industry, they must be helped to live.

Mr. Sissons said it was not the Government who induced the people to go on to that land; but they yielded to pressure. There were hundreds of thousands of acres of land elsewhere, with good soil and fair rainfall, to which they might be removed.

Mr. MILLS, Kanmantoo, said his Branch thought that some effort should be made to help those far northern farmers off the land, instead of pauperising them in the manner proposed.

Mr. GOOCH, Strathalbyn, had known the North for more than fifty years, and it was always dry; still those who thoroughly prepared their land, and regularly fallowed, sometimes got fair results.

Mr. M. RANKINE, Strathalbyn, said that those who lived in the more southerly parts could sympathise with those in the Far North, who were constantly suffering from drought; but to establish a permanent fund to help those who were sure to be always in difficulty was too much to ask. There was little hope for those who probably would get only one crop during five or more years.

Mr. J. CHERITON (Chairman) said his Branch was unanimous in the opinion that it was inexpedient to establish a permanent fund for relief of distressed farmers in the Far North and North-East. In an adjacent district there was at present a good deal of distress amongst farmers through three years' drought. There was a great deal too much of this going to Government for everything, appealing for help, and too much bolstering-up. After very considerable discussion on above lines the motion was unanimously carried.

Weight of "Bag" of Chaff.

In reply to questions upon this subject, the General Secretary stated that the resolution adopted at the latest Conference of Branches in Adelaide had been communicated to the Hon. Minister of Agriculture, who had replied that the matter could not be considered during the present session of Parliament. Inquiries had been made with respect to the practice in the other colonies, and it had been ascertained that there was no law in any colony regulating the weight of a "bag" of chaff. Several members spoke upon this question, but advanced nothing that had not already been urged at the recent Congress.

Adjourned till 2 p.m.

Harvesting, Storing, and Packing Apples.

Mr. Geo. Quinn, Inspector of Fruit, read the following paper:—

There are two methods by which the matured stage of apples may be determined. One is to select average fruits from the tree and, by cutting them open, note if the seeds have turned to a rich brown color. If this color covers the pips completely the grower can gather such fruits without any misgivings, but should the brown stain only partially cover the pips there is danger of those fruits shrivelling.

The second method is found in gently raising the fruit upon its stalk. Should it be matured the fibres at the junction of the fruit stalk and the spur upon which it is growing will have become disconnected and only the skin adhering, the fruit stalk separates cleanly, like a leaf in autumn, from the spur, and remains attached to the apple.

Of these two methods the browning of the pips is in most cases the safest to follow, as during some seasons, apparently after a drought, the fruits are less firmly attached, and will fall with the slightest encouragement before arriving at full maturity. If an attempt be made to gather apples before they are sufficiently matured, instead of the fruit stalk separating readily from the spur, the crown of the spur with the growing bud or buds near its apex will part and remain attached to the fruit stalk. This premature gathering is thus not only injurious to the present season's fruit, but destroys the spurs that are forming to continue the production of fruit in future years.

The above are simple and well-known facts; but another fact, also well known and as frequently ignored, is the difference in the ripening time of the apples upon any given tree.

In most of our orchards when the time arrives to gather keeping apples the trees are stripped unceremoniously of the great and small, irrespective of whether they are developed to their fullest size or not. Tasmanian growers in many instances are wiser, and spread the gathering of the fruits from some sorts over a period of several weeks, and by this means secure a more even-sized sample. The work of harvesting apples is not always regarded here as an operation requiring gentleness and skill. In many orchards vehicles are backed up to the trees and the fruits gathered with no soft uncertain grasp, and the concussion of the fruits striking the bottoms of the cases can be heard a long way off.

There are a few apple-growers who, with well-padded baskets and other receptacles, gather the fruits with great care; but, unfortunately, these are few and far between. With many the old saying about "the eternal want of pence," is changed to "the eternal want of time," but in such operations it would be better to hurry slowly.

Even the conveying of the newly-gathered apples from the orchard to the packing house is a side of the subject worthy of consideration, and only vehicles with suitable springs, to prevent sharp jolts, should be used. On steep hilly ground horses harnessed to carry well balanced baskets, such as are used in steep declivities in vintage work, should be employed to prevent undue jarring; for it must not be overlooked that freshly gathered apples have brittle moisture-laden skins, which are extremely easy to puncture, and thus open the road for insidious germs to enter and set up decay, which only show weeks later when the fruits are stored. The grower should endeavor to find out—if he is a beginner—the relative keeping qualities of the various kinds to be stored; and, besides keeping them separate, arrange them in such positions to preserve those for the longest period which return the best prices.

With the increasing areas under keeping sorts of apples, which are now coming into bearing, it behoves our growers to give more attention to the matter of storage. The apple houses found throughout South Australia to-day are as varied in form and construction as are the numerous makeshifts utilised for the purpose.

The crops of apples here usually run in alternating seasons of fair regularity. During a season of abundant yield the grower thinks of storing, and any outhouse, ranging from a renovated pigsty to an old barn or stable or galvanized iron shed, is pressed into the service; and the owner sometimes wonders what has gone wrong with the varieties which keep so well in the old country. Apples come into our markets and shops in winter odorous with the taint of mouldering straw or the mustiness of damp soil, and one is not surprised that the retailer puts a polish upon such specimens before offering them for sale.

In England, the United States of America, and in Canada the storing of apples has become almost a fine art; the refrigerating engineer, the bacteriologist, and the vegetable pathologist have all been called in to study the subject, and with what success can be best described in a telegram which appeared in *The Register* on Monday last, as follows:—"London, March 18.—A shipment of Californian apples, which had been stored for six months in a temperature of 35° F., was found yesterday to be in splendid condition. Three thousand cases were sold at prices ranging from 10s. 6d. to 14s. each."

All of the investigations into the keeping qualities of apples clearly demonstrate that they keep longest in an even, cool, dry temperature, ranging between 30° F. and 40° F., the best success being with the temperature used in the above Californian shipment, viz., 35°.

As previously remarked, the construction of most of our storehouses does not render the control of temperature possible; but without any great outlay of money or labor a structure can be made which will give its owner a great deal of control over temperature, and other conditions at present operating seriously against the preservation of his fruit.

In colder countries the danger of frost is great, here it is not to be feared. The structure which I would advocate is a combination of the suitable points clipped from many structures, and will come as near to possessing the necessary conditions as is possible without artificial refrigeration.

In nearly every orchard a gentle slope may be found into which an excavation can be made facing in some other than a northerly direction. This excavation should be sufficiently wide to allow an interior width of at least 9ft. after the retaining walls are built. The length will depend upon the quantity of apples to be stored. The depth of the excavation could be from 2ft. upwards, according to the drainage level. If the shallower depth is used, a wall at least 4ft. high must surround the excavation, and the earth removed may be banked up around the outside of the walls. The gable roof may be made cheaply with rafters of any rough timber, and a coat of thatch, from 18in. to 24in. thick, with a thick coat of good plaster laid over the thatch. At one end there should be a small window, with one glazed sash and a wooden shutter, so that light may be admitted or excluded. Inside the main entrance door there should be a small anteroom, with a door leading into the fruit room. This will effectually exclude draughts of warm air. At each end there should be a vertical flue, 4in. to 6in. in diameter, passing from the floor up through the roof. A flue not less than 6in. in diameter, leading out from beneath and about the centre of the floor of the store along the sloping hillside, preferably in the

direction of the cool breezes, and with sufficient fall to act as a water drain, if necessary, for a distance of about 100 yds., should be made, and the deeper this is made in the ground the cooler will the air become as it passes inwards. Through this horizontal flue cold air will enter the store, and by means of the vertical flues the warm air will be drawn out. These flues should have slides to push in or draw out, to regulate the draught. The interior of the house will be fitted with shelves on each side 3 ft. in width, with an outer guard ledge 6 in. high to prevent the apples rolling off. These shelves should not be closer than 18 in. if convenience of working is considered. The shelves should be made of narrow boards, with lin. spaces between them, and a little clean hay could be spread upon them prior to storing the apples; but the use of any substance conducive to the growth of mould fungi should be regarded with suspicion. The floor may be simply dumped earth or concrete, which will hold moisture sufficient to keep the fruits from shrivelling, and may be damped, if necessary, at any time.

The object of having the double shutter to the window is to exclude light, which hastens ripeness and decay in all fruits. A road should be made to the lower side of the slope nearest the door, for access by vehicles, and it should be remembered that if the whole depth of the storage cellar is below ground the even temperature will be more readily maintained.

When apples are first brought into the store, and for the first week or ten days, considerable moisture is thrown off. For this reason plenty of ventilation should be permitted until this ceases. After this the ventilation will require careful attention and regulation, and on warm days the flues should be closed, but opened at night to admit cold air. After the apples are placed upon the shelves the less handling or disturbing they receive the better, for if careful attention has been given in gathering, carrying, and storing, the keeping qualities will be fairly even. For these reasons I have always advocated grading the fruits from the trees to the store, as, generally speaking, fruits of one size keep uniformly.

If the hillside position be unobtainable, the best substitute would be a building above ground with double walls, the intervening space of which could be filled with sawdust or straw, or peaty soil, to obtain good insulation; but the great superiority of the inward and outward movements respectively of cold and warm air are the principal features in the before-mentioned design.

This apple store is not costly, and a handy man could make almost everything required in its construction. It would be perfectly close, and could be fumigated for the destruction of insect or fungoid enemies at any time, more particularly prior to being filled and after the season's fruits were all removed.

Respecting the packing of apples for distant markets, probably little remains to be said. That only sound, well-graded fruit, well developed, and slightly sweated, of sorts in favor in the said markets should be forwarded, is advice which should need no repeating. Some of our packers have now arrived at a system by which they select, grade, wrap, and pack their fruit in a manner which, for excellence of quality, appearance, and security, is not surpassed by any others in these colonies, and in general get up the contents of the cases are only slightly second to the Italian citrus fruits. In grading they are vastly superior to the Italian citrus fruits. This is the bright side of the picture. Notwithstanding all that has been said and written and printed in the public press upon this subject, it is painful to see the manner in which some growers (who assert their lifelong experience as a clinching argument to quell all objections) still pack up small sunburnt stuff, wrapped in inferior papers sometimes old faded dirty newspapers, packed in cases in such a manner as to rattle like a bag of marbles when the case is shaken—stuff which should never pass the pigstye, much less be put upon the English market as South Australian apples. Words fail to express a proper opinion of such rubbish when compared with magnificent samples which are truly a credit to the grower and the colony from which they came. With respect to packing the apples in cases, I must repeat my objections to packing the cases from the narrowest edge, as all these cases are carried, stacked, and handled on the flat broad side, and upon this all pressure must fall. Some packers actually pad with woodwool or paper clippings the narrow bottoms before beginning to place the fruits in, and also place a layer of padding on the narrow top when finished; the cases are then stacked on the flat side. This is equivalent to a man placing a sheet of iron under his feet to break the force of a blow aimed at his chest.

It has been urged in some quarters that as caterpillar-infested apples are not despised and prohibited from sale in London, our people here need not be so particular respecting the inclusion of fruits attacked by codlin moth larvae, providing they are of a fair size; but I am sure that the inclusion of such injured fruits would ultimately result in our apples losing their good name.

One has but to reduce this subject to the personal question—Would you prefer fruit thoroughly sound and untainted by insects, to that burrowed by a caterpillar? The universal answer would, I am sure, be in favor of sound fruit, and where the preference goes the best prices will also go.

In answer to questions, Mr. QUINN said that where the house was rather open and subject to hot draughts from outside, it would be best to pile the

apples 6in. deep in front of the shelves, and gradually rise to 15in. at the back. If the house were properly closed it would be easy to fumigate for destruction of codlin moth larvæ, and the shutters could be removed after all the apples were gone, so that all moths escaping the fumigation would fly to the light and remain imprisoned until they died. He described the "local" moth, or Light-brown Apple Moth (*Cacaecia*), and its caterpillars, as compared with the codlin moth and its caterpillar. The moth of the first is hazel-brown, and the caterpillar is rather slim, with greenish tinge, and extremely active when alarmed. The codlin moth is handsomely mottled, with golden blotches on each of its outer wings, and the caterpillar is rather thick when full grown, is sluggish, and has a pink tinge.

Mr. M. RANKINE proposed to convert a silo into a fruit store, and put up racks with trays which should carry only two to three layers deep of apples, but Mr. QUINN thought there would be a waste of space, and that possibly the apples would be too much exposed and would shrivel. The GENERAL SECRETARY believed that there would be a saving of space by adopting the rack and trays, and the air could be kept moist enough to prevent too rapid transpiration from the fruit by occasional light spraying or damping the floor. Mr. RANKINE said he had applied a solution of iron sulphate ("greenstone" or "copperas") to his apple trees and the "Woolly Aphis" or "American Blight" had disappeared. Mr. QUINN thought this effect was due to the hot dry weather, or to the operation of ladybird beetles, and that there would be numbers of the insects still upon the fibrous roots ready to come up to the branches when the weather becomes cooler. The only preventive of this pest is to plant only such varieties that have been doubly worked upon blight-proof roots and stocks—such as Northern Spy and Winter Majestic.

Selling Bags as Wheat.

Mr. W. G. MILLS, Kanmantoo Branch, read the following paper:—

I am actuated by the desire to remove what seems to me a most unjust tax upon the producers, and if we can only succeed in getting all farmers to take a firm stand we may do much to check those who are so ready to jump upon the lack of the producer, and they will not think of demanding such an unreasonable thing as that the producers should buy new bags at 5d. or 5½d., and then sell them back as wheat at 2s. 6d. or less per bushel, which means we sell the bag back at 1½d. No doubt the merchant makes ½d. upon the new bag, and if he buys them back as wheat, or for 1½d., he should make at least 2½d. upon them, so that if he does business upon a large scale he would make a very good profit out of the bags alone. Now, an average farmer, growing 400 bags of grain, would have to spend £9 3s. 4d. upon bags, and have to sell these bags, perhaps only a month later, for £2 10s. How can any man prosper who does business of that sort? If we quietly suffer this, the next thing we shall be asked to buy a bag for 5d., fill it with chaff, and sell it for 10d., chaff and all. Do we ever find the business people doing this sort of thing? If we get a case of goods worth £1 or £5, we have to pay for the case in which the goods are packed. Then, again, if it is fair to sell the bags as produce, why does it not hold good when the producer might have a chance to profit? Take wool, for instance. If we should sell our bags as wheat, why not sell our woolpacks as wool? But it is not so in this case. The producer, having a chance to get the best of the bargain, must give his packs away altogether, and have the last ounce deducted for their weight, besides tare and other allowances. If our Government put 1d. upon our incomes it would not amount to so much as we lose over these bag transactions. I hope somebody will take this matter up, and if no better scheme can be struck, see that the old system be reverted to. Perhaps in the future we shall dispense with bags altogether, and have our grain handled by some specially constructed trucks or bins, but until that comes to pass I submit that the producers cannot afford to buy bags to supply the rest of the community gratis.

In the discussion it was remarked that the bags in which wheat is exported are simply waste material, perhaps used for paper-making, &c. The wheat-buyers here obtained no allowance for them. If farmers were to combine and fix the price at which they would sell their grain, it would still remain with the wheat-buyers to decide what price they would give for it. The only way out of that difficulty would be for the farmers to organise and become their own exporters.

Influence of Forests upon Climates, and other Topics.

In consequence of two or three members of Branches having failed to attend, or to forward promised papers, the Chairman called upon the General Secretary to address the meeting upon "Influence of Forests upon Climate," "Shelter Belts," and "Conservation of Water for Irrigation Purposes," and he occupied about an hour upon this task. Some discussion followed.

Next Annual Conference.

Mr. M. JACOBS moved, and Mr. STONE seconded—"That the next annual Conference of Southern Branches of the Agricultural Bureau be holden at Strathalbyn during March, 1900." It was remarked that this place was favored in being most central, having a railway, and possessing more than one large hall in which meetings can be holden. Carried unanimously.

Votes of Thanks.

Special votes of thanks were accorded to Mrs. Stone for exhibiting such a large and splendid variety of home industries, and to the other exhibitors of products of the orchard, garden, and farm, and all those who had contributed papers and otherwise forwarded the business of this Congress were thanked most cordially.

Meeting closed at 4.45 p.m.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, MARCH 8, 1899.

Present—Mr. F. E. H. W. Krichauff (Chairman), Hon. A. W. Sandford, M.L.C., Messrs. S. Goode, Thos. Hardy, Professor W. Lowrie, T. Price, M.P., T. B. Robson, and A. Molineux (Secretary).

Drought-Distressed Farmers' Fund.

The CHAIRMAN stated that the committee appointed at the previous meeting had met the committee of the Drought-Distressed Farmers' Fund to consider whether it was advisable to form a Permanent Farmers' Relief Fund, the following resolutions being the outcome:—

"That this joint committee believes that a Permanent Farmers' Relief Fund is desirable, and that the administration of such a fund should be central and on the basis of the present Drought-Distressed Farmers' Fund."

"That a provisional committee, consisting of Messrs. S. Goode, John Miller, F. E. H. W. Krichauff, David Nock, and W. A. Magarey, be formed for the purpose of completing the organisation of a scheme for a Permanent Farmers' Relief Fund."

"That all Branches of the Agricultural Bureau be requested to at once submit suggestions to the provisional committee, through the Agricultural Bureau, and begin to collect funds, in either kind or money, for the above proposed Permanent Farmers' Relief Fund."

The SECRETARY said he had forwarded copies of the resolutions to each Branch, asking that they might receive early consideration.

Federal Entomological and Pathological Institute.

The CHAIRMAN mentioned that Professor D. McAlpine, of Melbourne, in a communication to him, advocated the establishment of a thoroughly-equipped entomological and pathological institute by the united colonies, instead of each having a small department of its own.

The SECRETARY said he advocated federation in this direction several years ago in a paper read before the Australasian Association for the Advancement of Science, besides urging the necessity for such action in the daily and weekly papers.

Members agreed that a federal institute, properly equipped, would be of far greater use and would cost less than is at present spent by the individual colonies on entomological and pathological work.

Smyrna Figs.

Mr. ROBSON tabled good samples of the true Smyrna and White Adriatic figs, both of good quality. The former were much superior and more meaty than the other. He artificially pollinated a number of fruits of the Smyrna fig with pollen from the Capri fig, but they nearly, if not quite, all dropped off. He left some, which he believed to be too small to mature, without pollinating, so that he could not be sure whether the fruits actually maturing were artificially pollinated or not.

Extracts and Translations.

The CHAIRMAN tabled the following extracts and translations from Foreign Agronomical papers:—

285 *Physiological Report* from Professor Dr. Frank, of the Berlin Institute, states that, besides generally making scientific inquiries chiefly into diseases of plants, he has answered in 1897 315 letters or packets containing rusty or otherwise diseased plants. In rye and wheat *Puccinia rubigo vera* and *Puccinia graminis* were found; in oats, the latter and *Puccinia coronata*. It may be interesting to know that late-sown oats, or if backward through drought, showed itself more affected, and what is still more interesting is that the oatfields were only infected whenever they were in a certain state after flowering, at which they arrived successively in the various heights of the mountains. That *Puccinia graminis* appears also without *Berberis*, and *Puccinia coronata* without *Rhamnus catharticus* being near, was again fully observed. The fungi on cereal leaves, which Frank for some years had specially observed, viz., *Leptosphaeria tritici*, *Sphaerella exitialis*, forms of *Septoria* and *Ascochyta*, he found as parasites, especially on the leaves of wheat, where many persons took them for rust. But, at all events, they interfered considerably with the formation of the grain. Another fungus on the leaves of rye or barley, which he discovered in 1896 (*Rhynchosporium graminicola*), was again the cause of the destruction of some fields of barley. *Helminthosporium gramineum* interfered also much with crops of barley and oats by attacking the leaves, which became covered with brown spots. Mr. Frank observed also the "breaker of the haulms of rye" (*Leptosphaeria herpotrichoides*) and the somewhat similar "killer of the haulms of wheat" (*Ophiobolus herpotrichus*). The former had 80 per cent. of empty ears after, in an otherwise fine crop, the fungus had attacked the haulms. In two cases only did *Cecidomyia tritici* do much damage to the wheat.

The dry rot and that of the heart of turnips and beets (*Phoma betæ*) was as general as in a drier summer and potash salts did not prevent the disease. *Phoma betæ* appeared merely as mycelium in large brown spots on the full-grown leaves and seed stalks, which gradually die; and the roots, although not affected, remain small. Where, however, the beet had been under water the leaves may appear not healthy, and afterwards the roots get rotten with *Botrytis*.

In addition to remarks about the six diseases of potatoes, which are now distinguished and described in my extracts under No. 247 of our *Journal of Agriculture*, Professor Frank again recommends to immerse the potatoes into Bordeaux mixture before planting, which, however, may not prevent the appearance of microcosms in the ground to infect them, from which the stalks may be getting black and the young tubers remain but small. Hitherto no parasites have been detected where potatoes show large brown or bluish spots in the flesh. He found potato scab (*Spongopora solani*) not as frequent as in Norway. The small eel-like animalcule (*Heterodora radicola*) found on potatoes in land that is constantly planted with potatoes do not seem to do any damage.

A disease in all kinds of clovers is the black gangrene (*Sclerotinia trifoliceum*), which sometimes kills up to 70 per cent. or 80 per cent. of the plants. *Ascochyta Pisi*, which, with much rain, not only produces spots on leaves and the shells of peas, but transmits the disease also to the peas, was again observed. You can ascertain where the peas are infected by putting them for twenty-four hours in water, when they will show a mould if diseased. [I had the *Ascochyta* in my peas in 1897 at Norwood, but although I planted the same sort in the same place again, with a view of obtaining diseased peas for transmission to Professor D. McAlpine, in Melbourne, who had asked me for specimens, I had no diseased peas this season,

probably in consequence of the dry September and October of 1898.—CH. A.B.] Against curl-leaf of peach trees (*Ectosacus deformans*) he recommends the use of Bordeaux mixture, and, where extreme, the cutting back of branches.

During the last three or four years in nearly all parts of Germany, and also elsewhere, a cushion mould (*Monilia fructigena*) has made its appearance, not as previously, on dry fruit which remained on the trees. This mould now attacks and kills, after the trees have been full of fine blossoms, the young fruits, and frequently also the young twiglets, mainly of sour, but also of other cherry trees, and more lately, also, of plum, apricot, peach, and apple trees. Cherry trees have thus lost from 5 per cent. to 100 per cent. of their fruit. Remedies recommended are to cut out and burn all branches that show dry bunches of flowers, fruits, and twiglets, and to spray the trees in winter with Bordeaux mixture. The spot disease of cherries (*Clasterosporium amygdalarum*) appears frequently with *Monilia*. It makes many small round brown spots on the leaves, and as these become dry holes are the consequence. This fungus shows also on half-grown fruits and on branches. Plum, apricot, and peach trees are also attacked. Another fungus attacking cherry trees is *Gnomonia erythrostoma*, which attacks leaves and pedicels by making them cling to the branches, and infects the next year fruits as well as leaves. For the present quite unaccountable, and appearing in both dry and wet seasons, was to Professor Frank the death of numerous branches on cherry trees. Within about ten days the leaves on them became dry from the edges.

A new pest has appeared in vineyards in Rhenish Hesse in the fungus "killer of roots" (*Telephora rhizoctonia*, Frank), the red-violet mycelium of which attacks the young roots, and destroyed a young vineyard altogether.

286. *Results of Manuring with Stable Dung.*—In a very long article with many tables Professor Maercker mentions as the results of his experiments that stable dung does not improve a crop to any great extent, and whether this is in a dry or wet season, unless it has been in the soil for months. If given shortly before a crop is put in the next crop will reap the benefit; and in the manure from horses, cows, sheep or pigs is in that respect not much difference. The same quantity of nitrogen in sulphate of ammonia and in stable dung was given to oats, and while in the former case the crop was not far from being double that from unmanured land, the latter showed hardly any increase; but when a crop of mustard was at once sown after mowing the oats, and without more manure, the stable dung gave a better crop of mustard than the land that had received the sulphate of ammonia. And the same good result had he with potatoes as a second crop after the block had received a little nitrate of soda and the necessary phosphoric acid manure.

Professor Maercker was of opinion that the straw must introduce into the soil great numbers of noxious micro-organisms which would devour part of the saltpetre in the soil as well as in the excrements. In a later article, after Dr. Kruger and Dr. Schneidewind had made experiments with the introduction of straw, and of sterilised straw, into the soil, he alters his opinion. These experiments showed that the sterilisation of the straw showed but little difference. When, however, the soil itself and the straw were sterilised better results could be shown. This led to the idea that the straw was necessary for nourishing the bacteria, and that then only they prevented nitrification. This explains, also, that old farmyard dung did always act quickly and well, and never, as fresh dung sometimes does, gives a poorer crop than without manure at all. Although the bacteria are still in the old dung, and are put into the soil, they cannot act without being fed with such carbon-holding food as straw. These latest experiments, which have been since verified by Professor Dr. Hotzer, are completely upsetting former opinions as to the destruction of the nitre in the manure and the soil.

287. *A Good Marl* is known if it effervesces evenly with nitric acid or muriatic acid. In dolomitic marl magnesia is also present, and in cold weather the acids will not work so quickly as in warm.

288. *The Ploughing of Stubble.*—To many it seems not to matter much at what time they turn over the stubble, and perhaps not at any good depth. Although probably not of so great importance in our dry climate, it is as well to state what pests and diseases may occur whenever the stubble is left for a very long time. Dr. M. Hellrung, of the Experimental Station at Halle, states, in connection herewith, that we may find the cereal flies (*Oscinis frit* and *pusilla*, *Cecidomyia destructor*, and *Hylemyia coarctata*) as well as the nematode of turnips (*Heterodera schachtii*), the wasp of cereal haulms (*Cephus pygmaeus*), the cereal aphid (*Siphonophora cerealis*) later at work in preventing many cereal plants from stooling, or from forming grains in the ears. Fungi also appear as the breaker of the haulms of rye (*Leptosphaeria herpotrichoides*), the killer of the haulms of wheat (*Ophiobolus herpotrichus*), and some fungi on the leaves as *Sphaerella*, *Cladosporium*, and *Septoria*. The first generation of the cereal flies place their eggs on the young plants, and especially on those from grain that has been shaken out, and the small white maggots eat through the young plants so that the middle leaf can be drawn out. A second and third generation are greatly destructive to oats and barley; the second in destroying the already somewhat larger haulms, and the third the heads. The above-mentioned wasp lays one egg on one of the knots of the haulm, and the larva eats it-self through towards the root crown, where it forms the chrysalis, and unless

the stubble is turned over on an early date the wasp will make its appearance. The cereal aphid puts its eggs on the stubble and destroys the ears by sucking the sap. Another very small black, almost lineal insect (*Thrips cerealis*), will be found on the stubbles, and will destroy later many flowers on the ear. The nematodes *Heterodera* are white animalcules, not larger than the head of a pin; they settle near the roots of oats, which cannot form any ears. The stirring of the stubble may prevent a second generation finding a resting shelter and food on self-sown oat plants. The two fungi, the breakers of the haulms of wheat and of rye, have become a very great danger to those crops in some parts of Germany. The haulms of the stubble become brown near the soil and sometimes break; inside you find a delicate loose tissue of fungoid threads, mostly white or else a pale grey-green. On the outside of the haulm you will soon perceive the perithecia of the fungus, like dust in black corpuscles, which contain the spores. These latter spread to the young wheat or rye, and either only here and there, or whole portions of the crop become white as if killed by frost. The leaf fungi make also the leaves and the plant die prematurely, and they also form their spores on the stubble. Dr. Hellrung finishes with the advice to plough the stubble in early and deep.

Professor LOWRIE said that in an average year over the larger part of our farming areas it was not possible to plough the stubble under now, though where it can be readily done it is a good practice to adopt. With the soaking the ground has had in many places, farmers could not do better than plough in the stubble in the paddocks they intend to fallow later on, so as to let the early rains soak well in. It was not a wise plan to plough up stubble land for sowing. It would be better to fallow each alternate year, and so get the same number of crops in the four years as if left out one year, fallowed the next, and cropped two years in succession, as is often done. If stubble land must be cropped, the best plan under most circumstances was to burn off the stubble, as they would then get rid of seeds of weeds and also insects.

Conservation of Soil Moisture.

Mr. HARDY thought more might be done by vignerons to get the full advantage of the rain that falls early in the season. The vines had suffered the last two seasons, and he believed much improvement could be effected, especially with hillside vineyards, by opening a furrow between each row to catch the early rains, following the contour of the hills.

In reply to question by the Chairman, Mr. HARDY said they found the best way to use the waste grape skins was to spread them on the land at once.

New Members.

The following gentlemen were approved members of the undermentioned Branches:—Wilmington, Mr. J. Schuppan; Pine Forest, Mr. F. Masters; Elbow Hill, Messrs. J. Rhen and F. J. Brooks; Richman's Creek, Mr. Fred. Mattner; Morphett Vale, Messrs. A. Pocock and — Liston; Naracoorte, Mr. G. Wardle; Lyrup, Messrs. D. J. Tree and J. Tye; Pyap, Messrs. Chas. Coulls, G. Napier, and J. F. Bankhead; Holder, Mr. M. J. Rowe; Colton, Mr. B. A. McCaffery; Golden Grove, Mr. J. Woodhead; Quorn, Mr. H. Porter; Mannum, Mr. F. W. Howard; Forster, Mr. J. A. E. Schenscher.

Reports by Branches.

The Secretary reported receipt since previous meeting of seventy-eight reports of Branch meetings.

BRANDS ON HIDES.—The annual loss to the Australasian colonies through brands being placed on the most valuable portions of the hides of cattle is placed at £300,000 by the Home Secretary for Queensland. At an inter-colonial conference of Ministers of Agriculture in 1895 it was decided to make laws and regulations to prevent this wholesale damage, but up till the present no action has been taken, except that Queensland threatens to place a Bill upon the files of their Parliament at the earliest opportunity if some federated action is not at once undertaken.

REPORTS BY BRANCHES.

Crystal Brook, February 25.

Present—Messrs. G. Davidson (Chairman), W. J. Venning, J. C. Symons, E. Dabinett, J. Chambers, and G. Miell (Hon. Sec.).

GLADSTONE CONFERENCE.—Delegates gave a report on proceedings of Conference. Members were of opinion that good resulted from these Conferences, and that the producers would benefit if more were held in other districts. A long discussion took place on the question of judging entire stock not perfectly developed, members favoring the disqualification of any such stock. This Branch desires that other Branches should take the matter up and try to induce judges at agricultural shows to act on uniform lines.

Port Elliot, February 25.

Present—Messrs. P. O. Hutchinson (Chairman), F. T. Fischer, J. Brown, H. Pannell, J. McLeod, H. Green, J. Davidson, and E. Hill (Hon. Sec.).

OFFICERS.—Mr. P. O. Hutchinson was elected Chairman and Mr. E. Hill was re-elected Hon. Secretary for ensuing year.

DAIRYING.—Paper in *Journal of Agriculture* by the Dairy Instructor was discussed. Members generally agreed with Mr. Thomson's suggestions in reference to breed, feed, and selection. They were convinced that there was ample room for improvement in the dairy stock of the district, and it was decided to endeavor to induce the Department of Agriculture to secure a good Shorthorn bull for the district.

SULTANA GRAPES.—Mr. Green tabled five bunches of Sultana grapes from his garden, and stated that they had borne very regularly for the four years since they came into bearing.

FRUIT FLY.—The Chairman drew attention to the danger of introducing the fruit fly into the colony. Members could see no means of preventing its introduction, sooner or later.

BONANZA OATS.—The Chairman read extract from *Australasian* extolling the virtues of this variety of oats.

Mundoora, February 24.

Present—Messrs. J. Blake (Chairman), R. Harris, J. J. Vanstone, J. Loveridge, W. D. Tonkin, W. J. Shearer, T. Haines, G. Haines, D. Smith, A. E. Gardiner (Hon. Sec.), and one visitor.

OFFICERS.—Messrs. R. Harris and W. D. Tonkin were elected Chairman and Vice-chairman respectively, and Mr. A. E. Gardiner re-elected Hon. Secretary for ensuing year.

STOCK DISEASE.—Mr. Blake reported loss of two cows from some complaint. The symptoms were:—Cows lie down, there is a slight foaming at the mouth, a rustling in the throat, with strong inflammation at time of death. They live only about four days after first signs of attack. He gave them a dose of Epsom salts and cream of tartar, but this did no good. Mr. Harris reported that a number of his sheep had been attacked by what appeared to be acute indigestion. They get stiff in the fore legs, and are unable to walk. He made a mixture of equal parts of cream of tartar, saltpetre, and carbonate of soda, and gave each sheep a tablespoonful of the mixture two or three times a day in water, with

very satisfactory results. He found that changing the sheep from paddock to paddock, and also changing the water, had a beneficial effect, and the sheep were now doing much better. Mr. Blake had sheep showing similar symptoms. He shifted them to another paddock, and repeated the change at short intervals, with the result that they were showing signs of improvement. One that was badly affected he also bled a little, by cutting the ear and tail, with satisfactory results. Mr. Loveridge said he had no trouble with his sheep in this way, a result he believed due to shifting them from one paddock to another as often as possible. Mr. Tonkin had lost a few fat sheep during the hot weather. He thought sunstroke or the excessive heat the cause.

WEEDS.—Members reported that noxious weeds were very prevalent in the adjoining districts, and the hope was expressed that the district council authorities would take necessary action to destroy them.

Bute, February 21.

Present—Messrs. W. H. Sharman (Chairman), A. Schroeter, W. Langford, H. Schroeter, D. Green, W. Hamdorf, E. Ebsary, J. Birch, J. Chapman, and M. Hall (Hon. Sec.).

WHEAT EXPERIMENTS.—Mr. Barnes tabled samples of Goose and White Monarch wheat from Bureau seed: both were very shrivelled. It was decided to suggest that at the next Bureau Field Trial prizes be offered for best samples of wheat.

CROWS.—Members reported that crows were very destructive to fruit, and would be glad to hear how to get rid of the birds. [Hang up pieces of bright tin so that they will swing freely in the wind.—GEN. SEC.]

Nantawarra, February 20.

Present—Messrs. C. Belling (Chairman), R. Nicholls, J. W. Dall, Jas. Nicholls, A. L. Greenshields, A. F. Herbert, S. Sleep, H. J. C. Meyers, T. Dixon (Hon. Sec.), and thirty-five visitors.

AGRONOMY PLOTS AT MOUNT TEMPLETON.—Mr. C. M. Grenfell forwarded an interesting report on experiments conducted at the Mount Templeton public school during 1898, of which the following is an abstract:—

MANURES.—Cowan's Purple Straw was used in this year's experiments, the wheat being sown on July 6, and harvested on November 27. Each manure was applied at the rate of 2cwt. per acre, and the results were as follows:—Superphosphate, equal to 25bush. 11lbs. per acre; Peruvian guano, 16bush. 2lbs.; bonedust, 9bush. 9lbs.; Thomas phosphate, 8bush. 12lbs.; kainit, 6bush. 35lbs. Last year the same manures were used, and, to test the residual value, the plots were sown with Purple Straw wheat, without manure, the results being:—Manured in 1897 with super., 1898 return, 10bush.; Peruvian guano, 6bush. 55lbs.; bonedust, 6bush. 30lbs.; Thomas phosphate, 6bush. 19lbs.; kainit, 6bush. 41lbs. These plots practically received no cultivation last season, the lines of drills being simply opened to depth of 1½ in. by means of a spade, and the grain sown therein.

THICK AND THIN SOWING.—Nonpareil wheat: 1bush. per acre sown, yield, 6bush.; 2bush. sown, yield, 4bush., crop very uneven, and large percentage of abortive heads. Grey's Early wheat, ½bush. sown, yield, 9bush. 51lbs.; 1½bush. sown, 9bush. 28lbs. reaped.

BROADCAST SOWING v. DRILLING.—Drilled seed 2 in. to 2½ in. deep, yield, 15bush. 2lbs.; broadcasted, and covered 1 in. to 1½ in. deep, yielded 11bush. 53lbs. Nearly half the broadcasted plants went down, and could not have been harvested properly except by hand.

CHANGE OF SEED.—Seed was obtained from a dry and from a wet district, and sown alongside local seed. Results—Purple Straw seed from Mount Templeton, 7bush. 15lbs.; from Hawker, 3bush. 50lbs.; from Millicent, 5bush. 50lbs. Steinwedel wheat, from Mount Templeton, 9bush. 34lbs.; from Hawker, 6bush. 12lbs.; from Millicent, 9bush. 11b.

VARIETIES.—A number of varieties of wheat were tested side by side. The earliest to ripen

was King's Jubilee, on October 29, and was also the best yield. Pride of Barossa was next in yield, and Steinwedel Early was second to ripen, being a day later than King's Jubilee. Early Para was two days later, and Steinwedel seven days later, but both were lower in yield. Ward's Prolific and African Baart came third and fourth in yields. Of barley, Cape was first, Beardless and Skinless coming next. Of oats, Scotch Grey gave the best return, Algerian being next, and Cape third.

RESULTS OF MANURING CROPS.—The Chairman drilled in a large portion of his crops with 35lbs. seed and 80lbs. to 90lbs. English super. per acre, and averaged 15bush. On portion of the fallow, the land being a stiff clay, he put on 2cwts. farmyard manure and $\frac{3}{4}$ cwt. fresh lime, but he got no better return than from broadcast without manure, the result being 9bush. per acre in each case. At the present low price of wheat the extra return from English super. was 14s. per acre, and he was confident that throughout the district it will pay to use this fertiliser. He estimated the extra cost as follows:—Manure, 4s.; drilling, 1s.; carting and cleaning extra crop, 1s. 3d.; extra labor, carting and handling super., 3d.; interest on money laid out on manure and drill, 5d.; total, 6s. 11d. per acre; less saving in seed, 8d. (ruling price at seed time); or a net profit of 7s. 9d. per acre. The total rainfall on his farm for 1898 was 14·5in. Mr. James Kelly, of Mount Templeton, gave his results as follows:—Purple Straw wheat, drilled in with 80lbs. English super., 11bush.; with 90lbs. bonedust, 7 $\frac{1}{2}$ bush.; with 60lbs. bonedust and 30lbs. English super., 12bush.—38lbs. of seed per acre sown in each case; 35lbs. King's Early Solid Straw wheat, drilled in with 100lbs. Thomas phosphate on stiff clay land, returned 17 $\frac{1}{2}$ bush. He believed this manure would pay to use on their heavy land; it benefited from being sown after rain. Mr. Frost's returns were—52lbs. Steinwedel wheat, drilled in with 80lbs. English super., 16bush.; would have been higher, but heavy winds shook out a lot; portion cut for hay went 2 tons per acre; adjoining portion sown broadcast only returned 8bush.; 40lbs. Champion oats, with 80lbs. English super., returned 24bush. per acre; 40lbs. Cape oats, with 200lbs. Kangaroo brand, returned 10bush.; 40lbs. Cape oats, manured with 80lbs. English super. returned 24bus., parts being badly cut by hot winds; Hogden's Surprise wheat, broadcasted with 120lbs. English super., averaged 18bush.; the sowing machine did not distribute the manure evenly, and parts of the crop were blighted; crop alongside, unmanured, only gave 8bush.; 52lbs. Early Para, drilled in with 100lbs. English super., returned 26bush. per acre; 52lbs. Steinwedel and 120lbs. English super. yielded 16bush.; with 200lbs. Thomas phosphate, the return was 13bush.; 45lbs. Hogden's Surprise wheat, with 200lbs. Kangaroo brand guano, 10bush.; with 80lbs. Colonial bone super., 16bush.; Baart wheat, drilled in with 120lbs. bonedust, yielded 8bush.; Dart's Imperial wheat, with 120lbs. Colonial super., gave 14bush., one end of plot being blighted by hot winds; the rest of the crop not blighted would have averaged fully 18bush.—it was a wonderful crop for the amount of straw, compared with the other plots; 45lbs. Dart's Imperial wheat, with 200lbs. Thomas phosphate, only returned 8bush. All these returns were obtained from fallow land. A piece of land ploughed in June and drilled by the middle of the month, was manured with 89lbs. Kangaroo brand guano, bonedust, and super guano respectively per acre. The whole field averaged 8bush., the super. guano being equal to about 10bush., but the others seemed to have no effect. Mr. G. C. Neville obtained a return of 13 $\frac{1}{2}$ bush. per acre from 30lbs. Cowan's Purple Straw, drilled in with a mixture of 90lbs. English super. and 20lbs. wood ashes; 37lbs. Steinwedel per acre, with same quantity of manure, gave 15bush.; these were sown before the rain came. The same quantity Steinwedel, with varying quantities from 80lbs. to 160lbs. Thomas phosphate, averaged only 8 $\frac{1}{2}$ bush.; the balance of same paddock, with English super., yielded 16 $\frac{1}{2}$ bush. per acre; 30lbs. Rattling Jack wheat, drilled in with 90lbs. English super., promised well in the winter, but, being a late wheat, it

suffered most severely from the hot dry weather, and yielded only 11bush. per acre; 45lbs. Steinwedel wheat, on freshly ploughed land, drilled in with 90lbs. to 100lbs. English super., gave 11½bush., while the same quantity of Thomas phosphate with same wheat only yielded 4bush. Mr. Beswitherick averaged 13½bush. per acre for English super.; Kangaroo brand guano appeared to do no good. Mr. Ratten sowed 40lbs. Steinwedel with 80lbs. super.; the outer portion of crop suffered most from hot winds, was cut and headed, yielding 10bush. per acre, against 12bush. from the centre of the paddock; 40lbs. Newman's wheat, with 75lbs. English super., yielded 16bush., the grain put through the winnower once and weighed 65lbs. per bushel; 40lbs. Newman's wheat, with 250lbs. old stable manure, gave 12bush.; Purple Straw, with 112lbs. Kangaroo brand guano, yielded 9bush., as did the same wheat with 112lbs. bonedust; with 75lbs. English super. the yield was 16bush. Mr. J. W. Dall got 14bush. from land manured with 90lbs. English super. Mr. Greenshields tried wood ashes, lime, Thomas phosphate, and English super., the latter being far the best. Mr. R. Nicholls reaped 15bush. per acre from land manured with English super. On another plot, that was badly affected by takeall the last time it was cropped, part was dressed with English super. and part with Thomas phosphate; both were reaped together, the yields not being kept separate, but the grain from portion manured with Thomas phosphate was the better of the two. On a piece of land not fallowed he drilled 130lbs English super. per acre with the seed, and reaped 24bush. The Hon. Secretary sowed 40lbs Algerian oats with 112lbs. English super., and cut 2 tons of hay per acre; 35lbs. Red wheat, with 90lbs. English super., gave same return; 30lbs. Dart's Imperial wheat, with 120lbs. Super. guano, yielded 17bush. grain. The opinion of the majority of those present was that English super. was the best manure for this district, and they would recommend drilling it in with the wheat up to 100lbs. per acre.

Lipson, February 25.

Present—Messrs. James Brown (Chairman), W. F. Darling, Charles Provis, H. Brougham, James McCullum, and E. J. Barraud (Hon. Sec.).

WEEVILS IN WHEAT STORE.—In answer to question, members were informed that if the store can be made effectually airtight the burning of sulphur would kill all insects and their larvæ. For wheat in bins, &c., bisulphide of carbon is the best remedy, provided the bins are fairly airtight.

MANGE ON HORSES.—In reply to question, a member was recommended to use flowers of sulphur mixed with grease to rub on the mangy spots, and give a few doses of pure flowers of sulphur. Wash all stalls with Calvert's carbolic.

MANURE FOR VINES.—The Hon. Secretary stated that his grape vines failed to properly mature their fruit, and wished to know what were the principal items required in fertilisers for vines. [Most probably phosphoric acid and potash. Try about 700lbs. per acre of a fertiliser containing 65lbs. phosphoric acid and 98lbs. potash. Muriate of potash contains about 59 per cent. potash, and superphosphate of lime (from bones) about 15 per cent. available phosphoric acid.—GEN. SEC.]

Arden Vale, February 27.

Present—Messrs. A. Hannemann (Chairman), M. Echert, D. Liebich, L. F. Warren, A. W. Pricker, P. Starr, J. Francis, F. Schuttlöffel, G. Miller, E. H. Warren (Hon. Sec.), and several visitors.

DRILLS.—An offer from a city firm was accepted to conduct a series of trials of a combined seed and fertiliser drill in the district.

FERTILISERS.—Mr. Eckert stated that Thomas phosphate was again a failure, owing to insufficient rain during spring. Mr. Schuttloffel had similar experience with sheep dung. Mr. A. Hannemann reported as follows :—

Although the last three seasons have been very much against practical Bureau work, I am glad to say that in our district a deal of trouble is taken by the farmers to obtain the best kinds of wheat for seed, and also by careful selection of best heads to get new varieties of seed. The results of thin and thick sowing (from 23lbs. to 45lbs. per acre) of Steinwedel and bearded wheats, mixed to prevent the former from shaking out and the latter from laying down, and other trials have been very interesting.

Three farmers in Wyacca sowed twenty-two bags of wheat each—No. 1 on 120 acres, No. 2 on 170 acres, and No. 3 on 250 acres. The land and seed were very much the same in all cases, but the cultivation of No. 3 was somewhat better than the others. No. 1 got 150 bags, No. 2 279 bags, and No. 3 370 bags. As a rule it was remarkable this season how well the thinly sown wheat yielded compared with thick crops. Of course if we had got good rains in spring it would have been different.

The opinions as to the benefit to be derived from sowing Steinwedel and bearded wheats together are divided, and further trials will be made. As usual, I did a little experimenting. I sowed eight different kinds of wheats and four of oats on little plots in my garden, so as to be able to watch them closely and compare the results. Dart's Imperial and another wheat (from Bureau seed) were complete failures, Baroota Wonder and Ward's Prolific yielded at the rate of 4bush. per acre, Baroota Success 6bush., and Steinwedel, Red Straw, and Early Para at the rate of 8bush. The oats were total failures.

PICKLING SEED—Members reported results of pickling seed wheat to have been very erratic last season. Some of the early sown crops had more bunt than those sown later.

AVERAGE YIELD.—The average yield of the hundreds, from Yarrah to Wyacca, is estimated at 6bush. per acre.

RAINFALL.—For 1898, by Mr. Hannemann, 13·25in.; by Mr. Echert, 13·12in.

Woolundunga, February 15.

Present—Messrs. H. Aldenhoven (Chairman), F. A. Sells, J. Grunike, A. S. Gunning, W. McLaren, J. Greig, G. Lewis, T. H. Prosser, and N. Rogers (Hon. Sec.).

AVERAGE RAINFALL.—The average annual rainfall for this locality is about 7in., and not 16in., as erroneously stated in *Journal of Agriculture* lately.

PAPERS.—It was agreed that it would be useful to discuss papers, &c., read before other Branches and published in the *Journal of Agriculture*, and that it would be of great benefit if an open column could be maintained for limited discussion of such papers.

Woolundunga, March 2.

Present—Messrs. J. H. Michael (Chairman), J. Grunike, H. Aldenhoven, A. S. Gunning, T. H. Prosser, F. A. Sells, and N. Rogers (Hon. Sec.).

HAY - GROWING WEST OF FLINDERS RANGE.—Mr. J. G. Michael read a paper upon this subject. The following is the substance of it :—

After seventeen years' experience in the locality he thought he could speak with some knowledge of this subject. Not less than 1,000 acres is requisite to allow of a certain portion being always under fallow by the end of September. If grasses or weeds appear they must be scarified out. A few sheep will be found very useful to keep down weeds. The land must be thoroughly well prepared before sowing. After trying more than twelve varieties of wheats for hay crops he preferred Steinwedel, Premier, and White Bearded, but the last has a drawback in being bearded. The time of sowing depends to some extent upon the season, condition of the land, area to be sown, and the facilities for sowing. For dry sowing March is early enough, but if rain comes early, he preferred first week in April, as he thought land worked after the first rain retains moisture better than that worked dry. In ordinary seasons May is quite late enough. About 40lbs. to 45lbs. seed per acre is sufficient to sow before rain, but

when sowing on dry land 1 bush. should be sown, to allow for malting of some of the seed. Hay crops should be rolled, even if the soil has been harrowed down finely. For stiff land inclined to cake use a light roller, say 14 in. diameter and 12 ft. long, with three horses. The rolling should be done when the plants begin to stool, and before they begin to stem. The best time to cut hay is when the grain has passed the milky stage. If there is much hay to cut the farmer will have to commence earlier, and should have everything ready to commence work at a day's notice. Hay should always, if possible, be cut with a twine binder. The sheaves should be stooked as quickly as possible by men following up the machines. The stooks should be large, sloping the outside sheaves and pressing them closely together. In this dry climate the sheaves will get quite dry enough in the stooks, and the sheaves will not be so likely to be blown over when stooked in this way. If the weather should be cool and damp great care must be taken not to stack too soon. If hot and dry weather prevails stacking may proceed within a week, or even earlier. There is a great tendency with sheaved hay to slip. For the bottom of the stack use a load or two of straw or inferior hay, as this part may become damp. The sides of the stack should be quite upright, as in settling there will be an outward tendency. The centre should be kept from 2 ft. to 4 ft. higher than the outside (according to size of stack), so as to have an outward slope. As the stack approaches completion the centre should be gradually made higher. When starting to top up it is a good plan to project a row of sheaves 6 in. or 8 in. beyond the others, selecting some of the longest for this purpose; this will help to throw rain off. After the row just mentioned place the sheaves with the heads down or outward, having the centre of the stack full enough to give them a good outward slope. Top up the stack with a load or two of loose straw to save thatching. Fasten down securely with lengths of fencing wire 3 ft. to 4 ft. apart, fastened on one side to stakes driven in the side and weighted on the other side. Do not make the stack very wide, not more than 18 ft. to 20 ft. in ordinary cases. A good shape for a stack of 60 tons is 50 ft. long, 18 ft. wide, and 18 ft. high, with 6 ft. to 7 ft. roof on top. With the exception of those near the ends the sheaves should all be placed crosswise, as this will facilitate the taking down of the stack.

Renmark, February 23.

Present—Messrs. S. Lowell (Chairman), W. H. Harrison, W. H. Waters, R. Kelly, and E. Taylor (Hon. Sec.).

SULTANAS.—Members are in favor of raising Sultana vines from cuttings; but one member had secured good results from single buds and from layering.

COW PEAS.—Mr. Harrison tabled a plant of the black-eyed variety, which had made good growth under irrigation. Some of the plants had produced over 100 pods, with fourteen to nineteen beans in each. The beans, when cooked, were a good substitute for haricots.

COCKROACHES.—A member wished to know how to rid his house of these insects. [Get some of Simpson's traps, made something like a spittoon; put a little stale beer in it, and the "roaches" will get drunken and drowned.—GEN. SEC.]

FLORIDA VELVET BEAN.—This has proved a total failure in every case, notwithstanding water supply in varying quantities.

KAFFIR CORN.—The red variety has shown stronger growth than the White dhurra.

Arthurton, February 17.

Present—Messrs. W. Short (Chairman), H. J. Freenan, W. H. Hawke, M. Lomman, T. B. Wicks, C. L. Palm, Job Pearson, J. B. Rowe (Hon. Sec.), and four visitors.

HOMESTEAD MEETING.—This meeting was held at the farm of Mr. T. B. Wicks. A great part of the business consisted of consideration of accumulated correspondence since the meeting held on September 29. One meeting since had collapsed owing to rough weather. A good deal of discussion occurred in connection with a letter from the corn trade section of Chamber of Commerce, re standard weight of present season's bushel of wheat. Members thought

millers and others ought to fix higher prices for best samples of wheat, as that would be an inducement to farmers to clean their grain to a higher standard of quality. Members thought the average weight of Yorke's Peninsula wheat this season was 65lbs. A fair sample of the Farmers' Union stack at Price gave an average of 65lbs. per bushel. In regard to field trials of agricultural and horticultural implements, members supported a suggestion that the Kadina Agricultural Society might advantageously amalgamate with the Northern Yorke's Peninsula Field Trial and Show Society.

Golden Grove, February 23.

Present—Messrs. T. G. McPharlin (Chairman), S. A. Milne, J. R. Smart, A. Roberts, H. Bowey, H. P. Day, F. Buder, Jno. Ross, A. Harper (Hon. Sec.), and two visitors.

HORSE-BREEDING.—Mr. Ross read a paper on this subject. He took exception to Professor Lowrie's statement that the draught stock of the colony had deteriorated. The breed was just as good today as it was twenty years ago. One had only to go to the market gardeners' picnic to see stock of the highest quality in considerable numbers. The fact was the farmer breeds good horses, which are readily purchased by dealers, with the result that the best stock finds its way to the city. Professor Lowrie appeared to think that holding, say, three large shows each year and doing away with the country shows would result in a marked improvement of our stock, as large prizes could be offered for stallions, on condition that the winners served a certain number of mares in the district. Mr. Ross did not think such prizes would do any good. They tried it at the Stanley show, offering £50, for which there was much competition. The next year the same prize was offered, one condition being that the winner should stand in the district. The owners of the winner fixed his fee at £25, making it prohibitive, so the district got no return for the money expended. It would be the same with any large prize offered at national shows. [Such result was due to faulty conditions attached to the prize. Any society offering such a prize as suggested by Professor Lowrie would make it a condition that the fee for service should not be more than a certain reasonable sum.—GEN. SEC.] He had followed up the matter of horse-breeding carefully, and his experience was that the best horses they now had were, in the majority of cases, the progeny of non-winners at shows. He had got better stock from colts than from prize-winners, and advised farmers to breed from their own colts. An animated discussion followed, members generally being antagonistic to the views expressed by Mr. Ross; though it was conceded that pedigree horses often left a large percentage of weakly stock, due to over feeding and insufficient exercise.

Elbow Hill, February 28.

Present—Messrs. E. Wake (Chairman), W. Beinke, C. G. Ward, I. Story, J. Foulds, H. T. Styles, J. Harvey, J. Rehn, J. Brooks, G. Wheeler (Hon. Sec.), and four visitors.

PROGRESSION.—Mr. H. T. Styles read a paper upon the subject, in which he agreed that the establishment of the Agricultural Bureau was a progressive movement, but he often felt disappointment that often no definite conclusion has been arrived at upon certain subjects after a lively and almost general discussion by members. Still, profit would result from each member giving his experiences, when founded upon the rainfall, nature of soil, and other circumstances characteristic of his locality. He questioned what object some farmers had

when they held their wheat on a falling market—often until the lowest limit is reached - and then sell at a big loss. They might call that speculation, but others who sold at the highest rates seemed to speculate more profitably. He considered the Farmers' Union a progressive movement. He had read with pleasure that the visit of the manager of the Wholesale Co-operative Society of Great Britain to Adelaide had resulted in three cargoes of wheat being now on the water for that firm, and he hoped to see the time when vessels will be freighted to Australia with cargoes of general merchandise for co-operative stores owned by farmers. In a discussion which followed, the Chairman remarked that farmers were totally in the hands of wheat buyers, so far as the price of that article was concerned, and much the same thing prevailed with regard to other produce. The Hon. Secretary disagreed, and said prices were regulated by supply and demand, and at present farmers were getting a very fair price, taking the English markets as a basis. The Chairman and Mr. Brooks thought the prices and freights in the newspapers were not always reliable. [Such "thoughts" should seldom be uttered unless they can be backed up by something more tangible and substantial. It is a very serious charge to make against the newspapers that they publish false or unreliable rates of freight or ruling prices in distant or local markets.—GEN. SEC.] Mr. Spence said it was possible for buyers to lay their heads together and fix their own prices. Some farmers displayed but little common sense in selling their wheat. They would seldom sell, if they could help it, on a rising market. As a wheatbuyer, he had resorted to the expedient of lowering the price offered, to induce farmers to sell. He was sure the wheat merchants were making a good thing out of the farmers, and believed the Farmers' Union had had a good effect on prices during the last wheat season.

Gumeracha, February 27.

Present—Messrs. W. A. Lee (Chairman), D. Hanna, R. P. Scott, A. Moore, W. J. Hannaford, W. Jamieson, W. Green, and Dr. Gray Nicholls (Hon. Sec.).

OFFICERS.—The election for officers resulted as follows:—Chairman, Mr. W. A. Lee; Vice-chairman, Mr. D. Hanna; Hon. Secretary, Dr. Nicholls.

POULTRY.—A paper on this subject by Mr. J. Monfries was read and discussed. The following is the substance of the paper:—

There is a great deal more in breeding and rearing poultry than our farmers think. If you visit farms you will be shown the horses, cattle, and pigs, and you will be told what they are bred from, how they intend to improve the breed, and such like; but if you ask about the poultry you will be told, "Oh, bother them; they are a nuisance and will not pay." And if you look around you will see a lot of small, inbred, herring-gutted-looking things, neither good for table purposes nor fit to produce eggs. If the same attention were paid to the poultry that is bestowed on the cows, pigs, &c., I am certain they would yield a good return. There are, of course, differences of opinion as to the best sort to keep, and a great deal depends on the climate and the locality. In a district such as ours, where it is so wet and cold, we want a heavy well-feathered fowl; but I do not think we can produce eggs here and make it pay like they can on the Peninsula or the Murray Flats, where it is a limestone country and warm. I should think the best thing to do here, where we are so near the city, would be to breed for table purposes. If anyone wished to go in for a breed to produce eggs alone I should recommend the Langshan, as I find they lay well both in the cold weather and in summer, and the chickens grow fast and strong. Then they are a good bird to cross with for producing table birds. By introducing an Indian Game rooster with the hens you will get fine birds, something to cut at, weighing when about 8 months old 10lbs. to 11lbs. Then again there is the Orpington, a fowl very much resembling the Langshan, but having no feathers on the legs. I have been told by those who have them here that they are splendid layers; they, too, should be good birds to cross with. I have also tried the Wyandotte, and consider them a first-class fowl, both for laying and also for crossing. They are nice, square, thick-set birds, very much after the Dorking style as regards squareness. I crossed the Wyandotte with Plymouth Rocks and produced a good laying fowl and large; I then crossed the progeny from them with

Langshan, with the result that the best of them proved some of the best layers I ever had. I am inclined to think I could work up a laying strain with these fowls that it would be hard to beat; it would only be a matter of waiting and culling and breeding from the best layers. Another good cross for table and laying is the Indian Game with Dorking hens. I have some now. They are hardy and grow well. Young roosters about 9 months old will weigh 11lbs. to 12lbs. Now, birds of this description would bring a good price in the market, and I am sure it is better to breed a bird like this than it is to neglect the poultry and let them go on breeding in until you could not find a bird to kill that would scale 2½lbs. Never be afraid to give a price for a good bird to cross with; you will be in pocket in the end. If some people are asked 20s. for a bird they think it a fabulous price, but it will pay if it is a good bird. Do not keep that bird too long; a change in the rooster should be made every two years; neither keep the hens longer than two and a half years. Young hens will lay better than old ones. If you want to get eggs when they are dear raise chickens as early as you can. The early chickens will grow the largest and strongest, and lay just when eggs are dearest. As regards fowls for laying, if it be a climate that is warm and dry I should go in for Minorca or Wyandotte. Hamburgs are also good, but their eggs are small, and if you want to kill for the table they are too small. I think all poultry for table purposes and eggs should be bought at so much a pound; this would induce people to produce a good heavy bird of good quality, and also eggs as well. Some of the eggs we see are hardly worth calling such, yet people get just as much a dozen for them as those who produce eggs twice as large. I have known people who carefully selected all the large eggs for themselves and sold the small ones, and who said, "Oh, we shall get just as much a dozen for the small ones as the large."

Mannum, March 3.

Present—Messrs. J. G. Priess (Chairman), O. A. F. Faehrmann, G. Lenger, J. Nickels, J. W. Walker, H. Brown (Hon. Sec.), and one visitor.

SEED EXPERIMENTS.—Reports on experiments with Bureau seeds were received. The only success achieved was with cow peas, and members were of opinion that, given the same attention, lucern would give considerably better returns than this plant.

ANTS ON FRUIT TREES.—Mr. Nickels reported having got rid of ants from his fig trees by use of London purple. A small quantity of powder was scattered around each tree, and in a few hours there were no ants to be seen near.

BUNT.—Mr. Faehrmann said he pickled his wheat for prevention of bunt, using ½lb. of bluestone dissolved in 1gall. of water to a bag of wheat. This treatment was successful. Mr. Kowald followed same practice with equally satisfactory results. Considerable anxiety was expressed at the spread of this disease, and the hope expressed that some really effectual remedy would be found. [The evidence of the members given above, agreeing with many others, is that bluestone pickle properly applied is an effectual preventive of bunt.—GEN. SEC.]

Forster, February 27.

Present—Messrs. J. Sears (Chairman), F. Towill, J. Retallack, J. Johns, F. Johns, W. H. Bennett, and three visitors.

RABBIT DESTRUCTION.—A good discussion on this subject took place. Members were of opinion that phosphorus was the best medium for the destruction of rabbits.

Pine Forest, February 28.

Present—Messrs. W. H. Jettner (Chairman), J. St. J. Mudge, A. Mudge, W. Wurfel, E. Masters, A. Inkster, F. Inglis, and R. Barr, jun. (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year nine meetings were held, with an average attendance of seven members,

Only one paper was read during the year, but Mr. J. Harford, of Port Broughton, gave an instructive lecture on manures. The annual conference of Northern Yorke's Peninsula Branches was held at Alford in March, and was a great success. In August, Arbor Day was celebrated, about eighty sugargums being planted in the grounds surrounding the usual meeting place. Great interest was manifested in the proceedings by the residents; and, notwithstanding the season, 40 per cent. of the trees are doing well. A produce and industrial show in connection with the Pine Forest, Mundoorra, and Port Broughton Branches was held at Port Broughton, and was very successful. The rainfall during the year amounted to 15.47in., against 10.75 the previous year, and 14.85in. in 1896. The retiring officers were re-elected, and accorded a vote of thanks for their services. The resignation of Mr. D. F. Kennedy, owing to his leaving the district, was accepted with regret, he having been one of the most active and zealous members of the Branch.

Kapunda, March 4.

Present—Messrs. J. J. O'Sullivan (Chairman), W. Flavel, G. Teagle, T. Scott, jun., Pat. Kerin, J. H. Pascoe, and T. Jeffs (Hon. Sec.).

BEST VARIETIES OF WHEAT.—Considerable discussion took place on the question as to the best varieties of wheat to grow in this district. A number of varieties were suggested, but White Tuscan was most favorably spoken of, possessing a good heavy grain, and the straw containing a large amount of saccharine. Purple Straw also came in for favorable comment.

CONFERENCE.—It was decided to write to Eudunda Branch *re* proposed Conference of Lower North Branches.

Paskeville, March 4.

Present—Messrs. H. F. Koch (Chairman), A. C. Wehr, A. Goodall, T. Trebilcock, J. C. Price, G. Meier, T. Moore, J. H. Nankervis (Hon. Sec.), and one visitor.

FIELD TRIAL SOCIETY.—Members are in accord with suggestion of the Chairman of the Northern Yorke's Peninsula Bureau Field Trial Society that the society should have grounds of its own on which all field trials could be conducted, and suggestions were made as to suitable locality. Other business of local importance was dealt with.

Davenport, March 3.

Present—Messrs. W. G. Pryor (Chairman), J. Holdsworth, J. E. Lecky, W. Hodshon, T. McDowell, F. B. Rathbone, and J. Roberts (Hon. Sec.).

WIND-BREAKS.—Mr. J. Holdsworth read a paper. The following is a condensation:—

We are all aware that, in addition to want of water, insect pests, and poor markets, the grower has to battle against the wind, which during a great part of the year blows with much violence over the Northern Areas, more especially when the fruit is setting and ripening, and when the wheatfields are laden with ripening corn. During last year the harvests of fruit and of cereals were seriously lessened by the heavy gales. In our vicinity gardeners have had their young plants completely torn out and destroyed and crops depleted by the wind. Many suggestions have been made and many schemes tried to afford protection to the crops. Fencing and stone walls have been tried with success, but the most efficacious of all have been hedges and tree-growing. The Conservator of Forests has under his charge reserves and nurseries

for the proper conservation of State forests and for the propagation of young trees. Municipalities have found the benefit of having trees planted in their streets, not only as a protection from the wind, but for shade purposes, and nearly all the towns of any note are now planted with trees. At Jamestown is this notably the case, and many of the farmers planted trees which have proved of great advantage to their holdings and proved effective wind-breaks. To successfully produce vegetables, fruit, &c., protection from the wind is an absolute necessity, and the problem is how to obtain the protection at the least possible cost. The Government or local governing bodies should plant at regular intervals with forest trees. The holders of land should provide around their holdings, on the fence line, a row of trees thickly planted. If united action were also taken in this matter the power of the wind would be considerably lessened, and intense culture could be more easily carried out. Some years ago the road through Hill River to Clare was planted with pine trees on road line, and plantations of trees for the protection of stock and crops. There pines and gums flourish together one side of the road, and on the other a magnificent hedge of olives was to be seen. At Laura the gardens are protected. At Gladstone clumps of trees have been grown and proved of the greatest advantage; and in and around the hills of Adelaide the question of protection against the wind had been one of the first difficulties dealt with. At Stirling North the benefit of the protection of the trees around the old garden of the late Mr. Goodiar is apparent, whilst the unprotected portions of the garden show the difference a break will make in the condition of the estate. The railway line should be planted from Port Augusta to the foot of the range, and would make a great difference to the holders of property on either side of the line. As to the question of what kind of wind-break one would recommend for gardens and blocks, there are many shrubs for hedge-growing which have been tried—gorse and sweetbrier, which may spread and become a great nuisance. The olive seems to be the best of hedge plants. It grows on the poorest soil, makes a good fence, and, if attended to, is very profitable. I have seen hedges of olives used for break-winds, and I must say they seemed to be the very thing for the purpose. The kaffir thorn requires a good deal of water to make it turn out a useful fence. There can be no doubt of its efficacy, and, when kept in order, makes a splendid fence. I have seen hedges of whitethorn, box, privet, &c., in the hills around Adelaide and in Victoria, but I fear they would not prove efficacious in the North unless provided with plenty of water. South Australian sugar, red, or blue gums, planted thickly along the fence lines, would prove as good as any. They give good shelter to the fields, lessen the force of the wind, and give shade for stock. One great advantage the gums have is that, once established, they do not require any but the natural rainfall. It may be asked what is to protect young plants planted as hedges until they come to maturity? I may suggest the use of native broom plant. I have seen it in use threaded through the wires in many places in the district. Brush can also be placed around the trees until they have grown to a height sufficient for them to maintain themselves. The tamarix is a good hedge shrub, easily cultivated and kept. I have not referred in any way to the benefits derivable from gumtrees, but, as we all know, they become after a few years very profitable in the way of firewood and timber, and in this way are of benefit. To be successful with gardens, &c., in this district, protection must be afforded the plant life from the cold winds of winter and the hot winds of summer, and the cultivation of hedges and trees, either in the fence lines or in plantations, must be entered upon, and receive as much consideration as any other part of the estate.

Colton, March 5.

Present—Mr. P. P. Kenny (Chairman), J. L. Higgins, E. Whitehead, John Shipard, B. A. McCaffrey, and Robert Hull (Hon. Sec.). Held at Mr. J. L. Higgins' homestead, Talia.

IMPACTION IN COWS.—The Hon. Secretary said every year, except last, he had lost three or four cows through impaction of the omasum, although he had tried all sorts of supposed remedies. Lately he had two cows attacked, and he had persevered with the remedy recommended in a circular sent out by the Central Bureau, and, although the animals were almost gone, the treatment had proved effectual, and they were quite well now. [The following is the treatment suggested in the circular referred to :—

Asthenic Apoplexy, Impaction of the Omasum, Acute Indigestion, &c.—Numerous deaths of cattle occur every year from one or other of these complaints, which are brought on by want of assimilation of the food, chiefly due to its dry, fibrous character. The only general treatment that can be recommended is the giving of purgatives, tonics, and soft food. Purgative.—Epsom salts, 1lb. to 2lbs.; ground ginger, 2ozs.; gentian, 2ozs. Give this in a quart of warm

water or 1lb of treacle. This must not be repeated. Enemas of warm water should be used. Tonics.—Give liquid ammonia, 1oz.; warm ale, 1qt.; essence of ginger, 1oz. Give also 1 dram of sulphate of iron in bran twice a week.]

SOWING WHEAT.—Mr. P. P. Kenny read a paper on this subject, to the following effect:—

The best time to sow wheat in this locality is from the middle of March till the middle of May. Before the first date is too early, and after the latter date is too late. About 40lbs. to the acre, broadcasted, is enough, except with regard to Steinwedel. If drilled, 30lbs. would be sufficient. After heavy rain 30lbs. seed broadcasted is plenty, but when the ground is rather dry 50lbs. would be needed, because much of the seed would malt or decay. Twenty-five years ago he used to sow with both hands, walking, but later on he sowed from the bed of a cart. Later still he used the broadcast seed-sower. The later invented patterns of seed-sower enabled him to sow more easily and evenly than by hand. All seed wheat should be pickled with bluestone in a cask. He used 2lbs. to 20bush. wheat, after cleaning the seed twice over. He would sow only the best wheat. Last season he used a combined seed and manure drill with the following result:—Started on May 28, sowing about 40lbs. seed and 60lbs. English super. to the acre, every second land fertilised, and sometimes only one round not manured, and then several lands manured. He had not intended to crop this land, as it had been cropped already rather too severely, but wished to try the effect of the fertiliser. The result was ninety-five bags of wheat off 40 acres, or an average of about 9½bush. per acre. He did not strip the manured and unmanured land separately, but was quite sure that the manured lands gave double the yield from the other. There was only a little over 7in. of rainfall during the growing period. Professor Lowrie had expressed a doubt whether it would pay for extra cost and trouble to use the drill without manure; but in this rather sandy soil he (Mr. Kenny) thought it would pay, because, in addition to saving of seed, the drilled wheat would stand up better and germinate better when covered evenly to a depth of 2½in. and not harrowed. When broadcasted the land should be harrowed twice.

NON-ATTENDANCE.—Mr. E. Whitehead directed attention to this subject. It was the duty of every member to attend meetings of the Branch if possible. Some members had promised to do this, but broke their promise. He had travelled fifteen miles to the meeting, but others who resided within fifteen chains of the meeting-place were absent. This he considered to be very unfair. [So it is!—GEN. SEC.]

Watervale, February 21.

Present—Messrs. H. Croft (in chair), L. Buring, E. Treloar, H. Beck, and E. Sobels (Hon. Sec.).

SUMMER CROPS.—Considerable discussion took place on the failure of the summer crops this season, notwithstanding the good summer rains experienced in the district. Some members thought the poor growth due to gathering the sorghum seed too early. Mr. Buring thought it would pay to sow earlier than usually done in this district to get the benefit of the early rains. Mr. Treloar noticed seed ploughed in had done much better than that harrowed in on fallow. Mr. Beck was of opinion that the seed should be covered twice its own depth. Mr. Sobels tabled fine growth of cow pea from Bureau seed.

ENSILAGE.—Mr. Croft drew attention to the fact that ensilage did not seem to catch on in this district. Mr. Buring referred to the value of ensilage, and methods of preserving.

BRANCH SHOW.—On March 1 the annual show of the products of the district was held, and proved a great success.

Angaston, February 25.

Present—Messrs. J. E. Swann (Chairman), F. Salter, J. Vaughan, M. Andrew, P. Radford, S. O. Smith, W. Sibley, E. S. Matthews (Hon. Sec.), and one visitor.

CONFERENCE AND SHOW.—It was suggested that a Conference of Branches in this locality should be held at an early date, and that a show of produce be held in conjunction with the Conference.

APPLES FOR EXPORT AND STORING.—Mr. M. Andrew read the following paper on this subject:—

In picking apples for export great care should be taken. The stem must be left on, and if it is too long, cut off a little below the level to prevent it damaging the fruit packed next to it. Exporters also tell us apples must be picked some days before packing, to allow them to sweat. This, I think, is a good plan, though I do not approve of tipping them out of the cases in the gardener's storeroom, then handling again, to cart perhaps three or four miles to the packing-room. I have packed a few cases for the London market three seasons following, and the last, the apples were picked and packed the same day, arriving home in good condition, and bringing the top price for the shipment—from 16s. to 18s. per case. This, I think, shows they cannot shrink very much after they are put in the cool chamber. The export trade has made rapid strides the last two seasons, owing principally, no doubt, to the quality of our fruits, and if we are careful to keep that up there will be no fear of our growing too many good winter apples. Now to the different sorts for export. I have great faith in our Cleopatra, especially for this district. There is no apple we grow to such perfection, and I venture to say most of our gardeners, walking up Rundle Street during the winter, can pick out the Angaston Cleopatra in any of the shop windows. In flavor, also, they are much better than those grown in the hills around Adelaide. Anyone who has land suitable for growing apples cannot go far wrong in planting this kind. As we have proved in our own market, the sale for this one kind is twice or three times greater than any other, so I think it will be when it is known in England and elsewhere. In picking for storing we must also be very careful. Stems must be left in. Any fruits that are cracked, or have rubbed against the branches, must be culled out and put on one side for present sale or for drying. The fruit should be put in a cool well-ventilated room—in shelves if possible; if not, on a board floor. I think they will keep just as well 3ft. deep, if the room is well ventilated and cool, as they will half that depth. My experience is that straw laid on the floor is not a good thing for storing on. It draws the moisture from the apples and retains it, and if one goes rotten it will soon have a lot around it the same way. Last year I was very successful in keeping my fruit on the fruit trays placed on kerosine cases, packed about 18in. deep. When I sold, fairly late in the season, there were scarcely any rotten. When building a storeroom it will pay to go to a little extra expense and have it well ventilated and kept cool. Then apples can be kept late in the season, when, as a rule, they are higher in price.

Stansbury, March 4.

Present—Messrs. A. Anderson (Chairman), J. Henderson, J. Antonio, C. Faulkner, P. Cornish, Jas. Sherrieff, Geo. Jones, P. Anderson, C. Hepenstal, and Geo. Sherrieff (Hon. Sec.).

BUNT.—A discussion took place on bunt in wheat and how to prevent it. Nearly all present were opposed to sowing wheat in wet or showery weather. They advised pickling with bluestone as a preventive, but found that if the ground is very wet or the seed gets rain on it there is likely to be bunt in the crop, even with properly pickled seed.

GRAPE CROP.—Mr. P. Anderson reported exceptionally good crop of grapes, especially Grenache and Shiraz varieties. He had rod pruned the former, and the results were better than anything he had had before.

Boothby, February 28.

Present—Messrs. J. T. Whyte (Chairman), R. Chaplin, J. Bell, F. Bradley, H. S. Robinson, H. G. Evans, and M. Leonard.

WHEAT EXPERIMENTS.—A discussion took place on the new varieties of wheat now being grown. Mr. Robinson expressed the opinion that, except in the matter of resistance to rust, no permanent improvement on the old varieties could be traced. The Chairman found that many of the new varieties did well for a year or two, but then deteriorated badly. Members reported that the wheat presented by Mr. W. T. Mortlock proved a late variety, and was therefore unsuitable for this district. American wheats, oats, and barley presented

by Mr. G. L. Ware were a total failure, owing partly to dry season and late sowing. Mr. Bell said he obtained a small quantity of Dart's Imperial wheat from the Bureau a few seasons since. From the crop he saved 38lbs. of seed, which he sowed last year on unmanured land and reaped 15bush., the sample being good. Members considered this a very gratifying result considering the dry season. Mr. Chaplin was pleased with the Champion Beardless barley grown from Bureau seed.

STANDARD BUSHEL.—An interesting discussion took place on the question of the standard bushel and grading of wheat.

Calca, March 4.

Present—Messrs. A. Plush (Chairman), Jas. Bowman, W. Wilcott, F. W. Freeman, D. P. Thomas (Hon. Sec.), and two visitors.

STANDARD SAMPLE OF WHEAT.—The Hon. Secretary read notes by Professor Lowrie from February *Journal of Agriculture* on the standard bushel and grading of wheat, and a long discussion ensued. Members indorsed the professor's statement, and were of opinion that there should be three permanent grades of wheat, viz., 60lbs., 63lbs., and 66lbs. per bush.; that all wheat should be graded on purchase and stacked separately, the bags being branded according to quality, so that a shipment could always be made up of one class; that unless this is done the Chamber of Commerce should be approached with a view to giving representatives of the producers a voice in fixing the standard for the year.

FLIES.—Flies are reported to be very troublesome this year to working horses besides the general stock. The Hon. Secretary wished to know whether there was any means of protecting the eyes of working horses from this pest.

Gladstone, March 4.

Present—Messrs. J. King (Chairman), J. Gallasch, J. Shephard, J. H. Rundle, C. Gallasch, W. A. Wornum, B. Griffiths, J. Brayley, J. Milne (Hon. Sec.), and one visitor.

CONFERENCE.—The Secretary reported on proceedings of recent Conference of Branches at Gladstone. The Chairman reported that a public trial of the disc plough would be held near Gladstone on March 11.

EXHIBIT.—Mr. Brayley tabled some very fine samples of grapes, one bunch weighing 7lbs.

Millicent, March 2.

Present—Messrs. R. Campbell (Chairman), H. Hart, H. A. Stewart, L. Oberlander, W. H. Rich, G. Mutton, W. J. Whennen, H. Warland, G. Tantram, H. F. Holzgreffe, S. J. Stuckey, A. McRostie, and E. J. Harris (Hon. Sec.).

SEASON.—Members reported that the potatoes that had escaped frost in the lower parts of the district were looking well, but a good area has been damaged. Fruit trees generally have made good growth, but the crops of fruit are poor. The Chairman reported that 90 per cent. of the Remarkable pines he planted were growing. It was recommended to sow field turnips and rye this month for green feed; on sandy soil sow rye, vetches, and Italian clover. Mr. Stuckey suggested that stubble land not to be cropped should be sown with grass seed mixed with a little rape for sheep. A discussion took place on

the relative merits of cocksfoot grass and rye grass, opinions differing considerably. Mr. Tantram said the tendency of cocksfoot to get tussocky could be checked by sowing more thickly. He had recently seen in England a meadow patch of this grass, sown when he was a boy, and still in good condition.

BUMBLE BEE.—Members wished to know whether this bee could be procured in the colony. [No.—GEN SEC.]

EXHIBITS.—The Chairman tabled plant of *Paspalum dilatatum*, still very fresh and green, notwithstanding the severe weather experienced. A large specimen of kohlrabi, weighing 18lbs., and a number of varieties of potatoes from setts received from the Chairman of the Central Bureau were also shown.

SEED EXPERIMENTS.—Members reported failure with cow peas and Florida velvet bean. Plants of the camphor tree received from the Bureau had all died.

Murray Bridge, March 11.

Present—Messrs. T. H. Wurm (Chairman), W. Lehmann, J. J. Stecker, H. Schubert, J. G. Jaensch, H. Block, Jno. Cowan, Hermann Schubert, R. E. Edwards (Hon. Sec.), and one visitor.

BEST VARIETIES OF WHEAT.—Mr. Heinrich Schubert initiated a discussion on this subject. He had tried several kinds, and favored King's Early. It was less subject to damage by rough weather than most early wheats, and yielded well. This season on land manured with super. he got equal to 25 bush. per acre. Mr. Block had not tried this wheat, but of those he had grown he preferred Pollock, as it stood up well, and there was not much waste from shaking out, and it yielded fairly well. He considered it better than Purple Straw or Steinwedel. Mr. Lehmann had best results from Purple Straw, Steinwedel, and Early Para, but much depended upon the season. some wheat failing one season and giving good returns the next.

Hartley, March 11.

Present—Messrs. W. Klenke (Chairman), H. Reimers, T. Jaensch, J. Jaensch, A. Thiele, H. Lehmann (Hon. Sec.), and one visitor.

BEST MANURES FOR WHEAT.—Much discussion took place upon the question as to which are the best manures for wheat in this locality. Mr. Jaensch preferred stable manure to guano, both of which he had used. Mr. Klenke preferred superphosphate of lime. He had sown three acres of barley, with 1 bush. of seed to each, and applied 2 cwt. English super. on part, and 1 cwt. colonial super. on the other. He got 31½ bags of barley from the lot, and considered the colonial super. gave the best result. Mr. Jaensch said bonedust gave better results on sandy soils than on clay land. Mr. Reimers used 1 cwt. each of bonedust, superphosphate, and stable manure on three separate acres. All three lots gave equal returns. The stable manure was put on the poorest soil.

RAINFALL.—January, 0.86in.; February, 0.98in.

Lyrup, March 7.

Present—Messrs. A. Thornett (Chairman), R. Brown, D. J. Bennett, A. Pomeroy, E. Layton, A. Meaner, W. H. Walling, D. Tree, J. Tye, T. Nolan, D. Thayne, T. R. Brown, W. H. Wilson (Hon. Sec.), and one visitor.

OFFICERS.—Mr. T. Nolan was elected Chairman, and Mr. Wilson re-elected Hon. Secretary.

EXHIBITS.—Mr. Pomeroy tabled two Imperial Improved sugar beets, grown from seed sent by Central Bureau. One had been transplanted, and weighed 9½ lbs.; the other, not transplanted, weighed 12½ lbs. Seed sown in July, transplanted in September, slightly gravelly saline soil. Questions asked—"Would it be profitable to grow these for sugar-making?" "What other use can be made of them?" [With our limited population it would be very unprofitable to grow beets for sugar, but for feeding to cows, sheep, &c., every farmer should grow some beets. An average crop would be about 7 tons to 10 tons per acre. Sugar beets will grow in most parts of the colony.—G. N. Sec.] Mr. Nolan tabled two trombones weighing about 40 lbs. each. There were nine of about the same weight on the one plant.

LUCERN SEED.—Mr. Menzies wished to know which is the best variety of lucern seed. [The common lucern (*Medicago sativa*). What is known as "sand lucern" (*Medicago media*), is rather more hardy, requires less humidity in the soil, and grows upon poorer soil. Seed of *Medicago sativa*, or the common lucern, grown at Singleton, in New South Wales, gave splendid strong plants at the Hawkesbury Agricultural College when tested alongside of imported seeds. If colonial seed can be procured, it will probably give a stronger growth than Hungarian or any other imported seed.—G. N. Sec.]

ANNUAL REPORT.—The Hon. Secretary read the fourth annual report. The report showed that there had been an average attendance of over eleven members and four visitors for twelve meetings. During the year three papers upon practical subjects were read and well discussed. Exhibits have been of a high standard. He wished to urge the members to assist each other in keeping the Branch up to its usual success in the future.

RAINFALL.—The Hon. Secretary recorded 1.96 in. rainfall for February.

Naracoorte, March 11.

Present—Messrs. O. Hunt (Chairman), E. C. Bates, J. D. Smith, J. Wynes, G. Greenham, G. Wardle, H. Buck, S. Schinckel, and D. McInnes (Hon. Sec.).

CONFERENCE.—Much of the business related to arrangements being made for holding the Annual Conference of South-Eastern Branches, at Naracoorte, on March 29.

DISEASES IN STOCK.—Mr. Wardle called attention to a foal out his way which was suffering from what was supposed to be lockjaw. He described the symptoms (like paralysis), and would like to know the cause of them. The Chairman said that feeding on half-thrashed grain often caused it. It caused a stoppage in the bowels, and produced symptoms like lockjaw. The Chairman said that there was a good deal of impaction about the district, and a great many cattle were dying from it. He had lost several. The cause of the complaint was a mystery to him. He had fed them on green feed, had given them bran, and had given them doses of salts—from 6 ozs. to 4 ozs.—for three weeks. He found that the bone of the animals with the complaint was much affected. Mr. J. D. Smith said he found doses of linseed oil the best. The Chairman said that it seemed to him that too much dry grass caused it; it seemed to be worse in country where there was abundance of dry grass. Mr. Bates said he thought there must be something in the conditions of the soil that caused the complaint. He could not think too much grass would cause it. The Secretary reported that the Naracoorte Station had lost several head from the complaint, and they seemed to have plenty of green feed as well as dry where the cattle were grazing.

EXHIBIT.—Mr. Wardle showed some very fine seedling peaches.

Mount Compass, March 11.

Present—Messrs. M. Jacobs (Chairman), R. Cameron, E. Good, C. S. Hancock, A. J. Hancock, R. Peters, W. Wright, H. McKinlay (Hon. Sec.) and one visitor.

EXHIBITS.—The following potatoes were tabled by members :—Vicar, small and poor yield ; Grampian, fair size ; Marjolin, small but yield good ; Athene, very poor yield ; Bruce, promises good yield.

SEASONABLE HINTS.—Plant late cabbages and cauliflowers, sow turnips, swedes, and green fodders.

AIDS TO PROFITABLE GARDENING.—Mr. R. Cameron read a paper to the following effect :—

In this occupation it is necessary to try to keep the cost of production as low as is consistent with the actual requirements. One question to be settled is, can the plough take the place of the spade in the swamps? In many places the ground is probably at present too soft and elastic to allow of a horse being put upon it ; but on the higher lands, most distant from the centre or main drain, the land is firmer, and a few furrows might be turned over with a plough, and in time the soil will acquire greater firmness and consistency, so that more and more land may be cultivated by the aid of that implement. The plough should be light and handy, and the horse light also ; or perhaps a pony would be able to do the work. Each alternate year the soil should be turned over with the spade. Possibly the disc plough might be light enough to work upon land that is already thoroughly broken up, but on the heavier land more strength is needed in all directions. He suggested careful trials of all kinds of manures on rows side by side, say, one or two rows with bonedust, one or two with super., and so on. Next year vary the experiment by using nitrate of soda where bonedust was applied, and where super. was put on try kainit, &c. In this way one could develop the latent fertility of the soil. Each man should keep a full record of all experiments, conditions prevailing at the time ; also, all costs of seeds, manures applied, bags, tools, time devoted to each crop, &c. In time he would find out where any leaks occurred in the income returns. Implements, bags, and tools cost money, and to save labor is to save money. Keep everything clean and in order for immediate work. A sharp spade, axe, &c., enables one to do his work quickly and easily, and a little labor spent in cleaning, oiling, painting, housing, &c., will save a lot of expense and trouble. A small workshop, fitted up with a few tools, should be kept by every gardener. A bolt, screw, nail, or rivet put in at the proper time may save a deal in repair later on. He thought cropping of the soil might be commenced earlier and continued later than is usual at present. He knew that some had tried this and failed, but was the experiment tried long enough? He thought that as the soil became more solid through cultivation it would get to be warmer and more mellow. He referred to experiences in much older countries in support of this idea, and thought some advantage might be secured from cultivating crops on ridges early and late in the season. Shelter must be provided for the horse, if one is kept ; and is necessary for the cows, which ought to be kept, if possible. Food, of course, must be provided in some form, and he suggested the growth of cereals, swedes, turnips, and other plants for this purpose. Pigs and poultry could also be kept, so as to increase the sources of revenue. Ornamental and shelter trees ought to be planted around the dwellings ; neither should the useful timber trees be altogether neglected. At one time of the year the neighborhood looks very bare and dismal, but much of this could be altered by the growth of trees, shrubs, and flowers. All these improvements cannot be brought about at once ; but improvements can be effected by constant effort in that direction.

Members agreed generally with Mr. Cameron, excepting with regard to cropping earlier and later than at present. It was agreed, however, that a few vegetables might be grown for home use.

Mount Bryan East, March 14.

Present—Messrs. W. Bryce (Chairman), H. Wilkins, James Prior, T. Wilks, T. Best, J. Honan, H. W. Collins, E. T. Prior, W. H. Quinn (Hon. Sec.) and one visitor.

MANURING AND SEED DRILL.—Mr. Collins said that he had drilled in twenty-six acres, and reaped 3bush. per acre more than from that broadcasted ; the former was much more smutty. Mr. Wilkins drilled in 38lbs. of seed with 78lbs. of Thomas phosphate per acre in fallow land, and reaped 11bush. He

also drilled in some in the same fallowed paddock with farmyard manure, and only reaped 5½ bush. per acre. Mr. Wilks drilled in fifteen acres (nine with Thomas phosphate and six with sheep manure) and reaped 8 bush. per acre. He also sowed 125 acres broadcast and reaped 6 bush. per acre. Mr. Best drilled in his wheat with sheep manure, 2cwts. per acre, and reaped 6 bush. per acre.

EXHIBITS.—Mr Wilkins tabled sample of Algerian oats, very strong straw, but inferior grain; barley, which had come on well, but lost all its grain with hot winds. Red beet grew very well. Mr. Best tabled barley which had grown very well, but the grain was small owing to dry season. Mr. Collins said that he had sown one bag of oats, and reaped thirty-four and a half bags from it; the land was flooded twice in dry district.

Redhill, February 27.

Present—Messrs. S. H. Treloar (Chairman), G. Wheaton, D. Lithgow, D. Steele, R. Siviour, R. Bayly, R. S. Nicholls, A. A. Robertson, H. Darwin, S. McDonald (Hon. Sec.), and three visitors.

"JERSEY COWS" AND "SHROPSHIRE SHEEP."—Mr. J. G. Dawkins read papers upon these subjects. He strongly recommended the Jerseys, and said they are not so delicate as some people suppose, but are as hardy as other breeds. The bulls are not vicious, but docile if properly handled and allowed their freedom. Keeping them chained would make them vicious. Jersey cows are above all others in rich milk, producing firm good butter, and keeping up the supply and good quality longer than other cows. He recommended crossing, but only a pure-bred Jersey bull should be used. The comparatively small quantity of food consumed by Jerseys, and the greater results given will more than compensate for deficiency in value as beef. In regard to the Shropshire sheep, they are very popular in England and America, and will be good for Australian farmers, as they combine the advantages of good wool, good mutton, and good tough fleece. Their meat is juicy and well streaked with lean and fat. They are hardy in times of drought, give a good percentage of lambs, which mature early, and their meat is tender. In discussion, the Chairman said that at shows in Sydney, in judging, a number of lambs of each breed are penned up, one of each lot is selected, slaughtered, dressed, and hung up, and the amount of offal is shown. This system might well be adopted in this colony.

Penola, February 11 and 18.

Present—Captain Fowler (Chairman), Messrs. E. A. Stoney, D. McKay, D. Balnaves, H. Ricketts, W. Miller, L. W. Peake, J. H. Sandiford, E. McBain, J. T. Morriss, Dr. F. Ockley, and one visitor.

OFFICERS—The Chairman reported the sudden death of Mr. T. H. Artand, the Hon. Secretary. Mr. R. Fowler was nominated to fill the vacancy, and, at the adjourned meeting on February 18, was duly elected.

ADJOURNMENT.—The meeting adjourned until February 18, when most of the members spoke in terms of eulogy of the late Hon. Secretary, and regret at his sudden demise.

CONFERENCE AT NARACOORTE.—Mr. E. A. Stoney reported upon arrangements made by a Committee of the Coonawarra Fruitgrowers' Association to exhibit a good representation of the products of the colony and district, and the Chairman promised to take charge of the display. Ten members promised to be present if possible.

AGRICULTURAL SHOWS.—The Chairman read a short paper, with a view to introducing a discussion, especially in reference to Professor Lowrie's paper on the same subject. It was decided to read the Chairman's paper at the Naracoorte Conference.

FRUIT FAILING TO RIPEN.—Mr. E. A. Stoney said that early in the season at Coonawarra, the trees—apples especially—gave every assurance of an unusual crop of fruit; but from the time of the fruit setting until one-third or one-half grown it continued to fall off, notwithstanding that the trees were kept quite free from insects and diseases. The Chairman thought cold, rains, and strong winds were considerably responsible for this state of things. This seemed to be borne out by the fact that those parts of the trees which were most exposed to those influences were bare of fruit, whilst in the sheltered parts a fair crop was yielded. This showed the necessity for windbreaks. Dr. Ockley thought that spraying whilst the trees were in bloom would result in imperfect pollination, but Mr. Stoney said the trees were not sprayed at that time. Mr. McBain said great care is necessary when spraying to have the ingredients properly proportioned, and kept well stirred during application. Mr. Sandiford, from years of experience, thought the chief cause was the exceptional drought of the past few years. He had noticed again and again that the wetter the season the greater the yield of all kinds of fruit. The older trees in the township bore good crops, because they were well rooted, whereas the roots of the younger trees had not yet penetrated any distance. Mr. McKay and Mr. Peake both thought that pruning and spraying might be overdone, and cause considerable harm.

Bowhill, March 4.

Present—Messrs. J. G. Whitfield (Chairman), J. McGlashan, J. Waters, W. G. Plummer, A. Dohnt, J. Gregory, C. Drogemuller, H. Plummer (Hon. Sec.), and one visitor.

EXPERIMENTAL PLOT.—It was suggested that the Branch should secure a small block of land upon which to try experiments with seeds, plants, fertilisers, etc., but the majority of members were of opinion that it would be better if each member would carry out these experiments separately. This would give a much greater range and diversity in the trials.

Onetree Hill, February 24.

Present—Messrs. J. Bowman (Chairman), F. Bowman, G. Bowman, H. H. Blackham, F. L. Ifould, J. Flower, A. Thomas, W. Kelly, E. A. Kelly, J. Clucas (Hon. Sec.), and several visitors.

HOMESTEAD MEETING.—This meeting was holden at the farm of the Chairman. The first item was a practical illustration of the mode of taking combs from a bar-frame hive, and then extracting the honey by means of a centrifugal separator; then some comb foundation was inserted in a frame and placed in a hive for the bees to build upon; and an embryo queen was removed in her cell to a queenless hive. Next, a visit to the fruit and vegetable gardens was made, and a lot of information was obtained with respect to cultivation, fertilising, and other operations. Fruit trees, though young had made much growth, and good crops had been gathered this season, and the Muscatel and Frontignac vines were bearing heavy crops of grapes. Water is supplied to the stock by syphon from a well 100yds. distant. Some very steep sidelands have been

followed by aid of a reversible plough. After the whole place had been thoroughly inspected the party, twenty-eight in number, were entertained by Mr. and Mrs. Bowman, and singing, instrumental music, and dancing wound up a most enjoyable meeting.

Strathalbyn, March 13.

Present—Messrs. M. Rankine (Chairman), B. Smith, R. Watt, P. Cockburn, H. H. Butler, and J. Cheriton (Hon. Sec.).

DISTRESSED FARMERS' PERMANENT RELIEF FUND.—Members were of opinion that no good results would accrue from adoption of proposals *re* Farmers' Fund, and strong opinions were expressed in reference thereto.

WATER CONSERVATION.—The Hon. Secretary mentioned that the Angas and Bremer both have their sources far into the hills, and very large quantities of water ran to waste into the lake. The greater portion of this could be utilised, and distributed by gravitation along contour channels over the extensive plains lying between and adjacent to the two streams. This would entirely change the aspect of the country, and farmers could then have orchards and vineyards around their homesteads, and could grow any amount of lucern, green fodder, and root crops, adding greatly to the dairy industry and our exports of dairy products. Some decided action should be taken. [Form a progress committee, collect statistics of cost of work, area that can benefit from the scheme, cost per acre per annum for water, &c., and then perhaps the scheme can be adopted.—**GEN. SEC.**]

Cherry Gardens, March 14.

Present—Messrs. R. Gibbins (Chairman), J. Metcalf, T. Jacobs, J. Lewis, C. Lewis, J. Potter, J. Mackereth, G. Hicks, W. Nicolle, E. Wright, S. Richards, J. Cheate, C. Ricks (Hon. Sec.), and four visitors.

GROWING CROPS.—Mr. C. Ricks said he had sown rape and mustard after advice from the General Secretary in the January number of the *Journal of Agriculture*; and on dry land which had previously given an early crop of potatoes and peas, he had now crops of green feed standing 18in. high. The land was ploughed and harrowed, and then sown. He had turned his cows on to eat it down, and was told that the plants would sprout again and give another good crop.

Albert, March 4.

Present—Messrs. J. Wetherall (Chairman), G. Haggard, G. Acres, J. Gill, F. Stevens, H. Lane, A. B. Struthers, H. L. Smith (Hon. Sec.), and three visitors.

PIG-BREEDING, &c.—Members discussed a paper upon this subject, as published in the *Journal of Agriculture and Industry*, and adjourned same until next meeting.

EXHIBIT.—Mr. G. Acres tabled five Brown Spanish onions, weighing 6½lbs.

Morphett Vale, March 8.

Present—Messrs. L. F. Christie (Chairman), J. Bain, H. Anderson, F. W. Hutchinson, — Liston, J. Depledge, J. Spriggs, A. Pocock, T. Anderson, and A. Ross Reid (Hon. Sec.).

SELF-SOWN HAY.—Members were agreed that self-sown hay makes excellent fodder for horses if it is cut early and well dried. It should lie in swathe half a day if cut loose, then be cocked, and left on the field for at least a week. Mr. Bain recommended addition of a little salt when stacking.

NOXIOUS WEED—Mr. Spriggs produced specimen of lance-leaved or California Thistle (*Carduus lanceolatus*), which is spreading in the district.

FARMER'S GARDEN.—Mr. F. W. Hutchinson read a paper to the following effect:—

Select about an acre of the best land, partly on a hillside if possible, enrich it well with old farmyard manure, plough it about 8in. deep, and follow each furrow with a plough without the mouldboard, stirring up another 8in. Before putting in plants manure again, and turn over with a plough to a depth of about 4in. About one-half the land might be planted with fruit trees, selecting only a few varieties of the best known and proved good sorts. These should be 18ft. apart each way, or 20ft. for trees of a more spreading habit. This would give fifty-four trees at 20ft., or sixty-seven at 18ft. apart on the half acre. Be sure that the trees were grown by a reliable nurseryman, and try to visit some of the best gardens before selecting, in order to pick up knowledge of which are the best kinds to grow. During the dry weather keep the surface soil loosened continuously, as this will conserve moisture and make the trees grow twice as vigorously as those that are neglected in this respect. In cultivation of vegetables, do not grow the same order or class on the same bed successively. That is, do not follow cabbage with cabbage, cauliflowers, turnips, &c., because these all require nearly the same kind of food. Rather put in peas, beans, carrots, parsnips, or anything different in nature to the former crops. Cabbages will stand deeper surface stirring than cauliflowers, because the latter produce many fibrous roots close to the surface which would be injured by deep cultivation, whilst cabbages strike roots more deeply into the soil. Plant them about 2ft. apart each way. Plant out early, after first heavy rain. To properly sow an acre of turnips 1½lbs. is a deal too much seed, therefore, when sowing a small bed, do not sow too thickly. Buy seed direct from the seed merchant or the grower, because the country storekeeper may have kept good seeds until they have become too old to germinate. It is worth while to test seeds before sowing. Place a certain number between the folds of a piece of flannel, keep it moist and in a warm place for three or four days, by which time they will have sprouted, if good, and the percentage of good seeds can then be ascertained. When sowing small seeds make the surface very fine and level, cover very lightly with fine loam or sand. Sow, if possible, during damp, cloudy weather.

BAD AND GOOD FARMING.—Mr. Bain read the following paper:—

I am farming on a very small scale; but will endeavor to give you my idea of bad and good farming. Owing to soil or season, a bad farmer may have a good crop, and a good farmer a poor one. Nevertheless the careless and indifferent man is really the bad farmer. He commences his work by taking out the farmyard manure, putting it down in heaps. As soon as the land is ploughable, he commences by striking up the old furrows, crowns back, leaving a strip about 6in. wide not moved at all. At first sight his work appears passable, but on examination you will find that in his hurry to get over the ground his plough is set too wide, and is leaving a strip 2in. wide every round not ploughed at all; the head land is only half the width it should be. When the crop is a foot or so high you can easily detect where every heap of manure was put down, having been spread so badly. He is not particular whether the seed is clean or not; never pickles it, as he considers it is not necessary. Most of his hay is cut loose for his own use, the horse rake following closely on the grass cutter. The hay thrown together without shaking out dust or stones, the stack is laid out too wide, poorest hay put on the top, which takes in the rain readily, stack built north and south, opens it the north end; or should he build it east and west, opens the west end. Never covers up the bench from the weather or poultry; feeds the horses directly from the stack, leaving a trade mark from stack to crib, never raking up the loose hay lying about. The sheaved hay is stoked and stacked too green. To make both ends meet, he sells what he can spare, but as there has been so much wasted, the stack he kept for his own use is not sufficient, and as he never saved or stored any wheaten chaff or straw, before the winter is through his stock are almost starving.

The great difference between the bad and good farmer is that the good farmer has his heart in his work, and endeavors as far as possible to make the best of everything. When taking out the farmyard manure he spreads it from the dray evenly, ploughs the ground cross ways if practicable, measuring the lands out carefully, opening up the furrows before crowning up, and if you examine the field after completion you will find his ploughing will bear inspection; furrows not too wide, good depth (this refers more especially for fallowing), clean work. He is careful to have clean seed, always picking the evening before sowing.

The hay out with the grass cutter is left lying in the sun for half a day before being raked together, unless the weather is very hot, when two hours or so would be sufficient; it is all

well shaken so that all dust, stones, &c., are removed, and the hay is sweet and clean. The hay cut with the binder is allowed to lie the same length of time, stooked for two weeks or more before stacking. The stacks are generally built east and west, not more than 7yds. wide; the poorest hay put in the bottom, the heaviest on the top; stack allowed to settle down before being topped up. As soon as convenient the stacks are securely thatched, opened on the east end, the bench always being covered up from weather and poultry; no waste about the stack to chaff house. Horses fed often; very little given at a time. Should he have any rough hay (if it is only a few tons) which he does not require, it is thatched and held over for another season. When thatching he always sharpens the butt end of the pegs, as they hold firmer, and has the string on the small end. When the wheat is taken off it is carefully winnowed as clean as possible. Wheaten chaff and straw got in early, and should it happen to be a dry or late season, he has something on hand to keep his stock from starving.

Mount Gambier, March 11.

Present - Messrs. J. Umpherston (Chairman), J. Watson, G. Collins, J. Bowd, D. Norman, sen., T. H. Williams, J. Dyke, and E. Lewis (Hon. Sec.).

THE BOT FLY—Fear was expressed that the bot fly would be introduced into South Australia from Victoria, as it is said to be prevalent at Hamilton and Casterton, and is known to have caused the deaths of several horses in Victoria. The flies deposit their nits on the legs and other parts of the horse, causing an irritation. To relieve this the horse licks the affected part, and the nits or larvæ find their way into the stomach, setting up inflammation, and killing the animal in many cases. The flies prevail from early spring until probably March. To protect the horses, some owners smear kerosine on the parts likely to be attacked. The bot fly is not included under the Act, and the inspectors have no power to prevent the introduction of horses, even though the signs of disease should be very apparent.

THE HEALTH ACT.—In reply to questions, Mr. Williams said all the machinery for keeping any district clear of diseases in stock was provided in the Stock Diseases Act, and in the new Health Act machinery was provided if the people chose to carry it into effect. The new Act was more for dealing with meat and milk supplies. It empowers the formation of County Boards of Health, which can erect and control public slaughter yards; supervise swine-yards, butchers' premises, &c. In case of an outbreak of disease, the expense would be borne by the Local Boards, but there was no provision for compensation to owners of diseased animals ordered to be slaughtered, except in cases where no disease was discovered after slaughter, in which case the Board would pay compensation. He believed that, if the tuberculin test were applied to all cattle in the district, not 2 per cent. would be found affected; but, eight years ago, in some herds quite 40 per cent. were tuberculous. That showed what could be done in stamping it out. Land on which tuberculous animals had been running need not be kept long unstocked especially in hot summer weather, and in winter there was a good swathe of grass which grew above the danger. He did not think sheep were attacked, and if pigs were occasionally affected, it was from the milk they were fed with. The great danger laid in direct contagion in limited pastures. Udder tuberculosis only, which would be dangerous to human beings (or other animals) who used the milk, would do no harm to the pasture, but usually became general all over the body before it reached the udder. He had known of several cases where milk from tuberculous cows had been unwittingly used or disposed of by the owners. An instance of direct contagion from milk came under his notice on the previous day. The milk from a cow was supplied to several children. One of them died of consumption at the age of 19 months, he believed, and one or two others in the family were now affected. The family used the milk from this cow for nine months, and he found when he examined the cow, by request, that she had

tuberculosis in the top of the udder. He did not think anything could show more convincingly than this the danger human beings ran of getting the disease from infected milk. He had the cow killed. She was not a waster, and was in good condition, but for about twelve months it was observed she had a dry cough. Mr. Wilson thought some directions should be issued to enable owners to detect diseases in their live stock. Mr. Williams said the Chief Inspector of Stock was preparing such directions for publication.

MANGOLD-EATING GRUBS.—Mr. Umpherston said the mangolds which had been eaten down by grubs had again started, and were now growing splendidly.

ONION CATERPILLARS.—It was stated that no remedy was known for the caterpillars which eat down the young onions. The only plan seemed to be to gather the pests by hand. [The Paris green, bran, treacle, and sugar mixture has been found perfectly effectual in case of caterpillars attacking onions.—**GEN. SEC.**]

Yorketown, March 11.

Present—Messrs. J. Koth (Chairman), G. Bull, C. Domaschensz, and J. Davey (Hon. Sec.).

FARMERS' RELIEF FUND.—Members thought the proposed Permanent Farmers' Relief Fund would do much good if properly carried out. They did not consider that the Government should be expected to continue to supply seed wheat.

MANURES.—Mr. Bull reported best results from English super. and guano super. Thomas phosphate gave equally good results on red soil, but not so satisfactory on the black soil. He used 70lbs. to 80lbs. per acre. On one strip he put 2cwt. per acre on and got 20bush per acre. The grubs attacked his crops the same as his neighbors', but although they fed right up to the heavily-manured strip in several places, the plants on this strip were never touched. It appeared to him that the manure was the cause.

Hawker, February 22.

Present—Messrs. J. Edgloe (Chairman), C. W. Pumpa, J. O'Loughlin, W. J. Schuppan, H. M. Borgas, T. Laidlaw, R. Wardell, S. Irvine, C. E. Harry, F. C. Hirsch, and J. Smith (Hon. Sec.).

WEEDS.—Mr. Laidlaw asked whether drake was a distinct species of plant. [Yes.—**GEN. SEC.**] He could not understand why his paddock should now be quite free from drake, it having been a curse to him about five years back. Members considered drake thrived best on shallow-worked ground, and that deep ploughing tended to get rid of the plant. Mr. Laidlaw reported spread of weed known as "devil's weed." The Chairman reported sheep weed to be spreading.

BUNT.—Mr. F. C. Hirsch thought if farmers would pickle their seed wheat about six or eight weeks before sowing they would not have to complain of bunt. Mr. O'Loughlin stated he knew a farmer who had sown wheat pickled three months before sowing, and some pickled just before sowing. The crop from the former was quite clean, but the latter was badly affected.

SEEDING.—Mr. Irvine thought stubble-ploughed land should be harrowed to cover the seed, and fallowed land harrowed before sowing. Messrs. Schuppan and Hirsch considered this all depended on the nature of the soil; on some land sheep travelling over the fallow was sufficient. The Chairman thought they should always aim at securing a good seed bed. Members spoke favorably of Steinweidel, Smart's Purple, Velvet Pearl, King's Jubilee, and the Old

Purple straw. The Chairman considered 45lbs. plump grain or 30lbs. shrivelled grain sufficient to sow one acre of land. Mr. Hirsch pointed out that half a bushel of seed per acre meant sixteen to eighteen grains to the square foot of land. All members considered drilling the seed in better than broadcasting it. Mr. Borgas recommends scarifying fallow land, sowing the seed, then harrowing it in: the crop would be benefited by harrowing it soon after it was up.

SALT FOR STOCK.—The Chairman reported that the horses were doing much better on well water than they did on rainwater, which he thought due to the absence of salt in the latter. He would advise stockowners to mix salt with the feed they give to their horses. Mr. Laidlaw poured brine over some straw when stacking it, and on opening the stack he found the straw quite white. His horses ate it very readily.

Dawson, March 11.

Present—Messrs. R. Renton (Chairman), C. W. Dowden, C. F. W. Just, A. J. Hooper, C. H. Meyers, O. Muller, A. H. Warner, A. F. Dempsey (Hon. Sec.), and one visitor.

STEEL CYLINDER WHEAT TANKS.—The Chairman read an article from the *Western Farmer* (Canada) describing the new method of storing wheat in steel cylinders. The tanks are air-tight, and are claimed to protect the wheat against damage by fire, thieves, insects, and climatic changes. They are also light and easily moved, and, as insurance was not necessary, the saving in this direction would pay for the tanks in about seven years. The article was accompanied by illustrations, and members thought the idea worth remembering when good times came again.

RAINFALL.—The rain recorded at Dawson for 1898 was only a little over 8in.

Brinkworth, March 4.

Present—Messrs. R. Cooper (Chairman), J. F. Everett, C. Horne, A. W. Morrison, W. Wundke, H. Cornish, and J. Stott (Hon. Sec.)

TRIAL OF SEED DRILLS.—Arrangements were made for trial of seed drills without any judging, Mr. Cornish offering to provide piece of land for trial, also seed and manure required. The trial was held on March 11, the Massey-Harris and Farmers' Favorite seed and fertiliser drills being shown at work to an interested audience. The Spalding-Robbins disc plough was shown at work and created a very favorable impression, the ground being of a favorable nature for this plough.

Meningie, March 11.

Present—Messrs. M. Linn (Chairman), J. Williams, T. W. R. Hiscock, W. Robinson, W. J. Botten, A. J. Myren, W. Trosser, W. Tiller, Thos. Joy, C. J. Shipway, R. M. Scott, H. B. Hackett (Hon. Sec.), and one visitor.

FARMING.—Mr. Joy's paper on "How to Manage a Farm" was again discussed. Mr. Tiller was opposed to keeping sheep and cows in same paddocks; cows would give a better return than sheep. The experience of dairy farmers in the district showed that cows did much better by themselves than with sheep. Mr. Hiscock agreed, but Mr. Robinson thought it a good plan to run a few sheep with the cattle, as the former would eat feed left by the latter. Mr. Joy in reply said Mr. Tiller had evidently misunderstood his suggestion. He did not advocate keeping sheep on a dairy farm; his paper dealt with mixed farming, and he recommended keeping a few sheep.

DRIFT SANDS.—The Hon. Secretary read a paper on "The Necessity for Stopping Sand Drifts," to the following effect:—

The fact that much of their land in different parts of the colony becoming drift is a very serious matter to all concerned. The causes of the drifts are various, but in the Northern district, as well as in parts of the South, he believed overstocking, rabbits, and drought were the principal causes. In the South the landowners had better prospects of overcoming the trouble than they had in the North. He could not help noticing how the drifts were extending both in this and the other colonies. Each year the country is becoming more cleared of trees, bushes, and other plant life, and as this goes on the wind naturally has more effect in shifting the top soil. The want of thought shown in the wholesale destruction of timber is surprising. The residents of this district will know what large quantities of timber have been removed or destroyed from around the lakes. This was a great mistake, as the fallen timber on the sandhills prevented drift, and in rotting fertilised the land and assisted to form a firm surface. The gain in feed by clearing the timber was not very great, as timber requires to lie very thickly to keep the stock away. Besides, any grass that was protected produced seed and helped to keep up the pastures. As soon as the land was so cleared it started to drift, and will continue to do so unless treated differently. It is alarming to see the quantity of land that has been so affected within the past two years, the best lands having in many cases been ruined. If the sandy lands continue to be overstocked and neglected it will not be long before they will be converted into sandy wastes. They had many instances of the devastation caused in other countries by the wholesale destruction of timber, scrub, &c., and he advised careful perusal of the paper by the General Secretary, read at Forest Range and printed in the November issue of the *Journal*. If energetic and systematic steps were not taken to cope with the evil they would soon have a large and increasing area of arable and pasture land ruined. In the majority of cases the drifts can be reclaimed, but perseverance and the expenditure of a fair sum of money will be necessary. The cause of a considerable area of drift can be summed up in one word—neglect. Drifts that were at one time only a few yards square, and could have been secured by an hour or two's labor, have extended over scores of acres. Some landowners have taken the matter in hand, and have been successful in stopping the drifts by sowing evening primrose, lupins, rye, barley, wattles, sheoaks, &c. He would advise fencing the drifts securely against stock for several years. On large drifts sow rye and plough it in about 3 in. deep. This should be done about the end of February to get the benefit of the first rains, and have a good growth before the winds set in. The land should be ploughed across the line of the prevailing winds. If these come from the south-west the furrows should run from north-west to south-east. July is usually very windy here, and unless a good growth is secured by then the plant will be cut off and unrooted by the drifting sand. Success must not be always expected at the first attempt. Marram grass, which has been such a success in some places, is regarded by some people as of too slow growth. Wattle and sheoak seeds should be thrown about on the drifts. People having holdings not already cleared should preserve belts of timber on the west and south sides and on the tops of the hills. Those who have cleared their holdings should plant trees and protect them until properly established. Where brush or rushes are obtainable within reasonable distance place this material on the portion of drift most affected and sow seeds amongst it. A number of drifts on station properties could be prevented by providing conveniences for watering on different parts of the run, so as to avoid constant travelling of sheep over the sandhills. The drifts over the main thoroughfares is a source of great trouble to travellers, and it seemed to him to be a question whether power should not be given in the new District Councils Act to compel landowners to take necessary action to prevent drifts from their lands injuring the roads. He hoped the Branches would discuss this matter and urge the landowners in their respective districts to take necessary action to prevent further damage from drift sand.

Mr. Williams agreed that this was a serious matter. He had been successful in reclaiming a large drift, and was quite certain others would have the same success if they went properly to work. He also thought there should be a law to compel landowners to keep their drifts from spreading. One man may easily be ruined by the neglect of his neighbor. This was a matter of great importance, and well worthy of discussion by other Branches. Mr. Tiller thought clearing off the timber had not only caused the land to drift, but the rainfall had decreased. He agreed that something should be done to stop the drifts, but who was to do it? He was opposed to power being given to district councils; in many cases the members being affected would do nothing. Mr. Myren said there was no doubt that the damage by drifts was very great. A neighbor of his had about thirty acres of good grass land destroyed through

the neglect of the adjoining landowners, sheds, wells, &c., being also covered. He certainly thought in such cases there should be some remedy for the victim. The Chairman thought something could be done to lessen the evil, but they must remember the landowners had no control over the wind, which was, after all, the chief cause of the trouble. [If the scrub, &c., were not all cleared off would the wind be the chief cause of the trouble?—GEN. SEC.]

STOCK ON THE FARM.—Mr. Tiller read a paper on "How to Keep the Largest Number of Stock on the Farm," as follows:—

In the first place, get a piece of land well cleaned by the end of March, put on plenty of farmyard manure, and sow before the first rain with English barley and tares. I prefer English barley, as it stands the frost better. As soon as it is fit, cut and feed to the stock. Sow again at the end of April with English barley and tares. It is most important to have a good cut of green feed the last two months whilst the natural feed is growing in the paddocks. If it is possible to take the stock off the paddocks it would very much increase the carrying capacity of the land for the remainder of the season. If the farm consists of 200 acres, put in fifteen or twenty acres for hay with 2cwt. commercial manure per acre, either superphosphates or super. guano. Bonodust is not to be relied on in our dry district. Sow as early as possible, and if the hay is to be fed to milking stock do not let it mature too much; cut it quite early. If intended to feed the cows twice a day, throw as much out of the stack at night as will be required for morning's use; damp it well and cover with a bag, and the hay will be almost as green and succulent as when cut. Do the same for night's use. This will increase the yield of milk. Do not sell any hay, as it will pay better to feed to the cows if butter is 9d. per pound and hay £4 per ton. Some people say that it does not pay to feed a cow when she is nearly dry, neither does it at the time, but you get better results after the next calving. Grow lucern if the land is suitable. Grow enough barley and wheat to fatten the pigs and poultry. Either boil the grain for pigs or grind it. The better the results obtained from the cows the larger number of pigs can be kept. If at any time there is more skim milk than required for pigs give it to the milking cows, and the results will be surprising. Dig a pit about 4ft. deep, build a dry wall about 2ft. above the ground and back up with the earth taken out. Have it near the cow and horse yards, put all the manure in it; put all ashes and fowl dung into it. About a month before carting it out give it a good wetting, and turn the whole mass over. The richer the feed the better will be the manure. I prefer the binder to the stripper, as the crop can be cut eight or ten days earlier than it can be stripped, and if the straw is chaffed and a little bran added it makes good feed for stock, and helps to keep a larger number on the farm. Cut the farm into several small paddocks and shift the stock often. Keep a few sheep if the land is of a mixed quality, but not on good grass land if a dairy is kept. By feeding the stock in the spring it gives all the grass a chance to seed; the result will be a better stand of grass next season. The use of commercial fertilisers is recommended for all grain crops, as this will about double the yield per acre. It would be wise to cultivate only half the quantity of land and use manure, leaving the rest for natural grass and herbage. Sow Thousand-head kale early in the spring after ploughing the land deeply and giving it a good dressing. Let it stand over the summer and it will start to grow again with the first rains, and as it grows very fast it will produce a splendid crop of green feed. In places where the natural grass is late this is an excellent crop to grow.

Mr. Shipway said the plan of dividing the farm into smaller paddocks, and frequently changing the stock from one to the other, had proved advantageous. The Chairman thought they might well follow Mr. Tiller's plan of feeding stock. He believed it was now considered best to cart the farmyard manure on to the land fresh and spread it at once. Mr. Tiller considered this objectionable, as it was likely to make the land dirty.

Koolunga, February 23.

Present—Messrs. T. B. Butcher (Chairman), J. Jones, J. Button, R. H. Buchanan, J. Freeman, and J. Pennyfield (Hon. Sec.)

GLADSTONE CONFERENCE.—Mr. Jones gave an interesting report on proceedings of Conference of Northern Branches held at Gladstone, on February 17.

KING'S JUBILEE WHEAT.—Mr. Jones said he had heard, on good authority, that one firm of millers had instructed their agents not to purchase this wheat.

STAR THISTLE.—Mr. Button drew attention to statement by a member of

Morphett Vale Branch that the star thistle did no harm to the hay crop and was readily eaten up by sheep. His experience was just the opposite to this. Other members agreed with Mr. Button. [It is quite possible this difference of opinion is due to applying the name "star thistle" to two different plants. The one common in many parts of the North (*Kentrophyllum lanatum*) is much coarser and larger than the true star thistle of the South referred to by members of the Morphett Vale Branch.—GEN. SEC.]

Meadows, March 11.

Present—Messrs. J. Catt (Chairman), F. B. Brooks, G. Rice, T. A. Buttery, G. Usher, F. Usher, D. Tester, H. V. Wade, W. A. Sunman (Hon. Sec.), and several visitors.

BRANCH SHOW.—The Annual Branch Show, held on March 2, was very poor this year, and resulted in a financial loss. The suggestion of the General Secretary to offer handsome framed certificates for groups of products was discussed.

Balaklava, March 11.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, G. Reid, A. Manley, P. Anderson, W. H. Thompson, J. Mills, E. Roberts, A. Hildebrand, John Vivian, J. Crawford, W. Smith, A. W. Robinson, E. Haines, and E. M. Sage (Hon. Sec.).

BUNT.—Considerable discussion took place on the cause of bunt, and pickling as a preventive. Members considered that seed reaped before ripe was more liable to bunt than fully-matured seed, and that the weather at seeding had a lot to do with the prevalence or otherwise of the disease, wheat sown in showery weather being very liable to bunt. Mr. Sires stated that when seeding he had to leave a strip of land uncovered overnight; the next morning was foggy with drizzling rain. The strip so left was badly affected, while the rest of the paddock was quite clean. Mr. Haines had a paddock, portion of which was fallowed and portion stubble land ploughed up; seed was sown across the two pieces at the same time, with the result that the fallowed crop was so badly affected as to be unsaleable. He therefore kept the wheat, and next season pickled some with 3ozs. bluestone and a double handful of salt per bag, and had no bunt in the crop. He had pickled his wheat in this way for several years now with success. Mr. Smith was never troubled with bunt until two years ago, when he neglected to pickle the seed. He usually pickled in new bran bags, putting the bags in the pickle first; he used $\frac{1}{2}$ lb. each of bluestone and salt to the bag. Mr. Manley tried pickling with Calvert's No. 5 carbolic acid, but it was a failure. The Hon. Secretary was in the habit of using well water when pickling, but was never free from bunt. Last year he used rain water, and although the seed was bunted he had none in the crop, except where he sowed a bag of seed containing a lot of "whiteheads" which it was almost impossible to wet. One preventive was to use only clean seed wheat. A neighbor of his usually pickled on the floor, and sprinkled a shovelful of fresh lime per bushel on the wet seed, mixing it thoroughly, and had clean crops. Last season, however, he did not use lime, and the crop was a good deal affected. Mr. Robinson thought there might be something in using rain water instead of well water for pickling; minerals in the latter might minimise the effect of the bluestone. He was careful to pickle his bags as well as the seed, but was troubled with bunt this year. Members quoted instances of unpickled seed sown alongside pickled seed and producing the cleaner crop;

they thought a lot of bluestone was very inferior and likely to do harm. Mr. Robinson wished to know how strong the pickle could be used with affecting its germinating power of the grain. Members agreed that pickling should be carefully done, using only new bags to put the seed in at harvest time and pickling the bags used to carry the seed out to the paddocks at seeding.

Yankalilla, March 23.

Present—Messrs. E. C. Kelly (Chairman), Jos. Grundy, G. Newbold, H. Leverington, John Cornish, G. H. MacMillan (Hon. Sec.), and one visitor.

MEMBERSHIP.—Regret was expressed at the death of Mr. Jas. Mayfield, who had been a member of the Branch since its inception.

MANURES AND MANURING.—Discussion on this subject (adjourned from previous meeting) ensued. Members unanimously advocated drilling in the seed with manure. One member stated that he manured a paddock with $\frac{3}{4}$ cwt. of super. per acre in September, 1897, and drilled in sorghum. In May, 1898, the paddock was sown with 40lbs. wheat and 1cwt. super., with the result of 4 tons of hay per acre from portion, and 22bush. of wheat per acre from the rest of the paddock.

EXHIBITS.—Messrs. Newbold and Grundy tabled fine specimens of vegetables, a watermelon grown by Mr. Newbold being extra fine. Mr. Grundy also showed some very fine peaches.

Pyap, March 14.

Present—Messrs. J. Holt (Chairman), W. Axon, J. Bowes, H. Mills, B. T. H. Cox, A. J. Brocklehurst, C. Coulls, E. Robinson, J. Harrington, C. Billett, J. F. Bankhead, G. Napier, W. C. Rodgers (Hon. Sec.), and one visitor.

FARMERS' RELIEF FUND.—Members expressed themselves in sympathy with proposal to form a permanent relief fund for distressed farmers, and decided to do all in their power to help on the movement.

WILD DOGS.—Members reported trouble in neighborhood from this pest. Regret was expressed at the reduction in scalp money, several trappers having determined to give up the business, as they could not make it pay at 3s. per scalp.

Inkerman, March 21.

Present—Messrs. S. Diprose (Chairman), E. M. Hewett, W. Board, J. Lomman, D. Fraser, and W. A. Hewett (Hon. Sec.).

SEPARATOR SLIMES.—Mr. Hewett called attention to note by the Dairy Instructor in the *Journal of Agriculture and Industry* for March, pointing out the danger arising from the practice of mixing the separator slimes in the skim milk fed to pigs. Members using separators had been in the habit of feeding the slime to pigs, and appreciate the warning of the Dairy Instructor. They also expressed their intention of burying the contents of the separator bowl in the future. Members spoke of the many useful notes found in the *Journal of Agriculture and Industry*, and consider it the most useful paper published in the colony for cultivators of the soil.

THICK AND THIN SOWING.—This matter was well discussed, members being agreed that $\frac{3}{4}$ bush. of wheat per acre was about the right quantity to sow in this district; if sown too thin the plant grows rather rank, and is more liable to injury from red rust.

DISTRIBUTION OF FERTILISERS.—The question of broadcasting *v.* drilling fertilisers was discussed, the evidence to hand being that about equal results had been obtained from both methods, but that the difficulty of even distribution was against broadcasting the manure.

Kadina, March 9.

Present—Messrs. T. M. Rendell (Chairman), D. Taylor, J. M. Inglis, S. Roberts, and J. W. Taylor (Hon. Sec.).

FIELD TRIALS.—Matters in connection with the Field Trial Society were dealt with. It has been decided to hold a trial of ploughs about the end of September, and to arrange if possible with a farmer to sow twenty acres early, in order to be able to hold a trial of mowers and binders at same time. The Chairman thought the Society should obtain land of its own near Bute, Kadina, or Paskerville, on which these trials could be held. Members agreed, and it was decided that inquiries should be made respecting suitable blocks of land for the purpose.

CONFERENCE.—A conference of Northern Yorke's Peninsula Branches is to be held at Port Broughton on April 26.

Mylor, March 11.

Present—Messrs. W. Nicholls (Chairman), W. H. Hughes, P. Probert, F. Rosser, W. T. Elliott, F. G. Wilson, T. Mundy, E. A. Cheeseman, A. Phipps, E. Wilson, S. W. Jackman, W. G. Clough (Hon. Sec.), and ten visitors.

DAIRYING.—Mr. E. Wilson reported having waited on the Minister of Agriculture to urge the needs of the district to the loan of a good Jersey bull. It was resolved to form a "Cow Club" on co-operative principles, to assist the blockers in obtaining cows.

Quorn, March 23.

Present—Messrs. R. Thompson (Chairman), G. Altmann, J. B. Rowe, Jas. Cook, C. Patten, H. S. Stacey, H. Porter, W. Toll, J. Johnson, and A. F. Noll (Hon. Sec.).

PERMANENT FARMERS' RELIEF FUND.—This Branch thoroughly approved of this movement, and Mr. R. Thompson was delegated to receive subscriptions in money or kind.

BEST THREE VARIETIES OF WHEAT FOR THE DISTRICT.—The Hon. Secretary read a paper on this subject, to the following effect:—

The seasons being so unreliable it is rather difficult to decide. Last year the rain stopped at the end of August, and the early wheats had by far the best chance. Had another inch of rain been distributed during September and October some of the later kinds would have been the better yielding. He advocated sowing both early and medium varieties. For hay sow early sorts, so as to have an early start. Sow Steinwedel and African Baart, either separately or mixed, and the crop will come in with the wild oats. For grain sow medium varieties, such as Purple Straw, Baroota Wonder, White Tuscan, Dart's Imperial first, and keep the early sorts for late sowing. In ordinary seasons it is quite safe to sow African Baart as late as June, and a good crop will result. If the early varieties are sown early it is probable they will come into ear in June or July and be injured by frost. By the time the early-sown sorts are cut for hay the medium varieties will be ready to cut, so that the binder can continue its work; or wheat will be ready to cut in its well developed dough stage, following with the stripper when the grain is fully ripe. It was scarcely possible to state which were positively the best three varieties of wheat for the district, but they might be found amongst Steinwedel, Twenty

Weeks, King's Solid Straw, Purple Straw, Baroota Wonder, and Tuscan. Good results have been obtained from Ward's Prolific and Leak's Rust Resistant, both good for hay and reliable if rust should appear. None of the grass seeds or forage plant seeds sent up by the Central Bureau for trial, or introduced by others, have succeeded in this hot dry district, and it would appear that the only reliable thing is wheat, which, with the wild oats, will make the best hay for the North. Rye is even harder than wheat, but is so tough, fibrous, and bitter that it is questionable if it is worth growing.

Members generally agreed that Steinwedel, King's Solid Straw, Purple Straw, and Red Straw are the varieties of wheat which have given the best results.

NATIVE GRASSES.—Mr. Rowe had cut some of the indigenous grasses and placed them at the bottom of his haystack. The only trouble was through the grass seeds. He advised all to cut the grasses when fairly high, and place at the bottom of the stacks.

NEW WEED.—The Hon. Secretary tabled sample of a weed which has recently appeared in the district; seeds very plentifully, and is not at present eaten by stock. Sent on to the Central Bureau for identification. [It is a species of *Heliotrope*, and is not a "noxious" weed, although by no means a desirable acquisition in any pasturage.—GEN. SEC.]

Port Elliot, March 25.

Present—Messrs. P. O. Hutchinson (Chairman), J. McLeod, J. Brown, J. Davidson, and E. Hill (Hon. Sec.).

TUBERCULOSIS.—Considerable discussion took place on this subject, and Mr. McLeod promised to give a paper on his experiences with the disease.

LUCERN FOR DAIRY COWS.—The Chairman read paragraph from *Australasian*, showing value of well irrigated lucern to dairy farmers. In the territory controlled by the Rodney Water Trust in the Goulburn Valley there were eighteen farmers, half of whom used the water supplied by the trust for irrigating their lucern paddocks. It was ascertained that these nine farmers were delivering 380galls. of milk per day to the factory, whereas the other nine who failed to make use of water for irrigation purposes, only supplied 104galls. of milk daily, and this quantity was rapidly falling off. The Chairman also read an extract from same paper on the value of crimson clover as a green manure crop in the orchard. Not only did it enrich the land in nitrogen, but it also enabled the soil to hold the moisture better.

Minlaton, March 25.

Present—Messrs. H. Boundy (Chairman), S. Vanstone, J. H. Ford, R. Higgins, D. G. Teichelmann, Jas. Anderson, W. Correll, A. McKenzie, M. Twartz, Jos. Correll (Hon. Sec.), and two visitors.

BEST WHEATS, &c., FOR DISTRICT.—Mr. W. Correll read the following paper:—

"Which are the best kinds of wheat to grow?" As wheat is grown in this district for milling purposes, we must select our varieties from the kinds of wheat best suited for flour. One of the most popular of our wheats is the Purple Straw, on account of the color of its straw as it nears the ripening stage. Purple Straw has been largely grown ever since the first farmers brought it to the Troubridge area, but it will lose its purple color if grown on the same land for a number of years. It also loses its quality of early ripening, and yields smaller grain of irregular size. One of the next wheats which came to stay was the Steinwedel, a very early wheat with a purple straw, large grain, shakes out badly, even before it is ripe; but many farmers who condemned it on this account again took to growing it because of its prolific nature. One very noticeable characteristic of this wheat is that it does not stool much, and has to be sown thickly. This wheat, on account of its property of quickly maturing its grain, has yielded a good grain when other wheats have failed during a red-rusty

season. Another wheat which has been grown in the district successfully is the kind called Rattling Jack, also a quick-growing wheat; Ward's Prolific has been grown by several farmers with good yields, while others have found it to yield badly. It is one of those varieties which will deteriorate if grown on the same land several years. A variety known as Dart's Imperial has proved to be one of our best all-round wheats. It is one of the best stooling varieties, takes a good root-hold of the ground, matures its grain quickly, grain getting hard before the straw is dry, is a very hardy plant, a good yielder, is an easy wheat to reap, and is an excellent hay wheat. Another new wheat called Hawke's Club Head was grown in the district last year, and like Dart's is a white straw wheat, yielded well, and if it keeps up its characteristic of early ripening and yield, will prove one of our good wheats.

I am unable to say which three of these five kinds are the best; but I think every farmer is safe to include Steinweidel, inasmuch as he is able to harvest before other varieties would be ripe.

Farmers will remember that a committee of experts called the Red Rust Commission, or some such name, took a lot of evidence with a view of discovering some means of combating the ravages of red rust amongst the wheat crops, and the conclusion they came to was a very practical one, viz., growing the early quick-growing varieties and more frequent change and choice of the best qualities of seed.

New varieties may be obtained by selection where several varieties grow together and have been accidentally cross-fertilised. We have a new variety of bearded wheat, to which the name King's Early has been given, which promises to be a very prolific wheat. Another variety—Petatz Surprise—is spoken of as a very promising wheat. Wheats which are the best in one locality do not always do well in another. Some wheats, although early, do not do so well when sown very early—for instance, Steinweidel; and they are apt to show takeall or black rust.

More frequent change of seed wheat that has not been grown too long in one land is desirable. It is worth while, since drilling with fertilisers is the practice, to experiment in this direction by choosing land on one's own farm which has been early fallowed, or perhaps subsoiled, and sowing it with the best samples to get seed for next season.

There are kinds of wheat which are prolific, but with such flinty grain that millers do not buy it. These may be good wheats to grow for feeding purposes, or for hay, such as the Solid Straw wheat, Medeah or Atalanta. I think the Bureau might be made the means of a better exchange of wheat. Some time ago the General Secretary tried to get farmers to send particulars of any wheats they had to exchange, but not many took advantage of it.

Paskeville, March 25.

Present—Messrs. H. F. Koch (Chairman), A. Goodall, J. C. Price, A. Bussenschutt, F. Bussenschutt, G. Bamman, W. Ayles, A. C. Wehr, and J. H. Nankervis (Hon. Sec.).

WHEATS FOR DISTRICT.—After much consideration, it was concluded that the three most suitable and best-yielding varieties of wheat for this district are Purple Straw, Dart's Imperial, and Rattling Jack; for hay, Tuscan and Early Para. A mixture of Cape oats and Early Para wheat gives a good hay.

Port Germein, March 27.

Present—Messrs. George Stone (Chairman), W. Crittenden, P. Hillam, W. Head, W. Masters, and A. H. Thomas (Hon. Sec.).

PERMANENT RELIEF FUND.—Each member proposes to give one bag wheat to this fund, and all farmers in the district are to be asked to subscribe.

Mount Remarkable, March 28.

Present—Messrs. A. Mitchell (Chairman), G. Yates, C. E. Jorgensen, H. B. Ewens, T. P. Yates, H. Humphris, J. B. Murrell, D. Roper, T. H. Casley (Hon. Sec.), and one visitor.

GRIST MILL.—A public meeting is to be called at an early date, when it is very probable that steps will be taken to start a grist mill.

Auburn, March 23.

Present—Messrs. J. E. Isaacson (Chairman), G. R. Lambert, D. Lyall, P. Cornwall, J. B. Schober, and Dr. J. W. Yeatman (Hon. Sec.).

HEADING WHEAT.—The Chairman tabled sheaf of headed hay, showing the stage in which the wheat should be reaped and the manner in which Moody's patent header did its work. (See article on subject elsewhere in this issue.) He was very well satisfied with the principle of cutting portion of the crop with the binder and taking out the wheat by means of the header. He had received from the sale of the sheaved header straw as much as he would get from 13 bush. of wheat per acre at present price, while he had on hand the cocky chaff, &c. For the header to do good work the crop should be even, at least 2ft. 6in. high, and tied tightly rather closer to the butt than ordinary work. He had got as much for his headed sheaved hay as for ordinary wheaten hay.

Port Lincoln, March 17.

Present—Messrs. R. Puckridge (Chairman), J. D. Bruce, E. Chapman, J. Telfer, J. Anderson (Hon. Sec.), and visitors.

EXHIBITS.—Mr. F. Wilkins tabled snake cucumber measuring 3½ft. long. These cucumbers are very good for either a salad or pickle.

MERINO v. CROSSBRED SHEEP.—A lengthy and very interesting discussion took place on the relative merits of merino and crossbred sheep. All the members agreed that for large flocks merinos were best suited for that district. Mr. Puckridge said that a Shropshire cross was the best for the Adelaide market and for export, which trade he considered would be most profitable.

Arthurton, March 23.

Present—Messrs. W. Short (Chairman), W. H. Hawke, Baldock, Parker, J. B. Rowe (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—This meeting was held at the residence of the Chairman. Before commencing business members inspected matters of interest, including a new Massey-Harris seed and fertiliser drill, which was considered to be a decided improvement on last season's make, although the hoes were thought to be capable of improvements. Members adjourned to the house, where refreshments were partaken of.

FIELD TRIAL SOCIETY.—The Hon. Secretary reported on proceedings of meeting of delegates of the Bureau Field Trial Society at Bute. It had been decided to hold the next trial of binders, side-delivery mowers, and grass cutters about the end of September. The trial will be held near Paskeville if the local Bureau can get a farmer to put in very early about twenty acres with an early variety of wheat so that the crop will be fit to operate on at the time mentioned. Strippers would not be included in the trials, but it was proposed to arrange for ploughs, as, although considered too late by some, others of the delegates thought it would be a good chance of testing the work of the ploughs in hard ground. It is proposed to endeavor to secure a piece of land near one of the railway stations in the district for the society, so that all the field trials could be held there and various experiments carried out. This idea met with the approval of the members of the Branch.

BUNT.—Considerable discussion on this subject took place, members being of opinion that now the drill is in general use it is imperative that every ball of bunt should be got out of the seed wheat, as a single ball left in will when

dry get crushed passing through the drill, and all the seed going through will be re-infected. Mr. Hawko said a neighbor of his had adopted the best means he had seen of pickling his seed. He had a wooden trough about 10ft. long, divided in middle by a strainer that would not allow the wheat to pass through. The trough worked on a pivot in the centre, and sufficient tilt was allowed for to enable the pickle to be drained off from the wheat to the opposite end. The wheat was poured slowly into the pickle at one end, the bunt balls, smut, and rubbish being skimmed off as they rise to the top. When pickled sufficiently the trough is tilted, the pickle drains to the other end in readiness for the next lot of seed.

Brinkworth, March 23.

Present—Messrs. S. Auger (Chairman), J. Graham, A. W. Morrison, H. Bastian, C. Horne, W. H. Pearce, James Stott (Hon. Sec.), and two visitors.

CONFERENCE.—A letter was received from the Port Broughton Branch *re* Conference to be held there on April 25. Delegates were appointed to attend, and Mr. C. Horne promised to read a paper there.

BEST WHEAT FOR DISTRICT.—Much discussion took place on this subject, and the general opinion was that Purple Straw and Red Straw were the best: Early Para was considered best for hay. Mr. Hill asked whether any member had tried the Allora, which he thought was a good wheat either for hay or for milling. He had always obtained good results from Red Straw, and he preferred it to any other for milling purposes.

Narridy, March 11.

Present—Messrs. H. Nicholls (Chairman), J. C. Myatt, R. Satchell, John Liddle, and James Darley (Hon. Sec.).

GLADSTONE CONFERENCE.—Mr. Nicholls reported on this Conference.

DISEASE IN POULTRY.—A discussion took place upon a disease which is very prevalent amongst the poultry in this district.

Lucindale, March 18.

Present—Messrs. E. Feuerherdt (Chairman), G. C. Newman, B. A. Feuerherdt, and E. E. Dutton (Hon. Sec.).

BLINDNESS IN SHEEP.—The following recipe for this complaint was received from the Naracoorte Branch:—Mix some sugar of lead in a pint of cold rain water, and put in a piece of wire with some copper on the end of it, and leave it in the solution over night, when it will be ready for use; water may be added if it is too strong.

HOMESTEAD MEETING.—This meeting was held at Mr. G. C. Newman's residence, and Mr. Newman showed the members round his place. The garden is very well kept, and so also is his wattle plantation. Some of the wattle were only sown last year in rows 9ft. apart; others that were sown broadcast about two and a half years ago were looking very well, the best ones being those that are growing in poor sandy soil, one of them yielding over 1cwt. of bark. Mr. Newman had always advocated the growing of wattles on poor land in that district. The garden is a large one, containing about 500 vines and fruit trees, mostly apples, nearly all worked by himself. It is on a good piece of land, and well situated, not catching any winds. Peaches, grapes, &c., also looked very well. Mr. Newman's poultry mainly consists of Hamburgs crossed with Langshans, having a nice even appearance.

Robertstown, March 29.

Present—Messrs. N. Westphalen (Chairman), W. Mosey, H. Rohde, F. Fielder, T. Hagley, and S. Carter (Hon. Sec.).

DAIRYING.—The Hon. Secretary read synopsis of Mr. G. S. Thomsqu's article on dairying and dairy cattle. Members complained that they were not getting any benefit from the services of the Ayrshire bull loaned by the Department of Agriculture to the Bureau, owing to other bulls kept in the neighborhood and wandering at large breaking through the fences and getting with the dairy cows just when the services of the Ayrshire bull would be utilised by the owners of the cows. It was suggested that the owners of these mongrel bulls should be proceeded against, but it was pointed out that this would not effect the object for which the bull was obtained by the Branch, *i.e.*, the improvement of the dairy herds of the district.

WATER CONSERVATION.—This subject was discussed, and the opinion expressed that the schemes for water conservation should be nationalised, and it was suggested that the Bureau should combine to urge this on all candidates at the coming elections. [This is a matter affecting the policy of the Government, and therefore the suggested action cannot be taken by the Branch Bureaus.—GEN. SEC.]

DESTRUCTION OF VERMIN.—Members were of opinion that it was useless attempting to poison the vermin when there is green feed about, and that it is useless one taking action while others neglect their duty. Combined action was necessary to secure any degree of success, and in dry seasons it was evident that the rabbits could be cleared out by the use of phosphorised baits.

Forest Range, March 23.

Present—Messrs. J. Vickers (Chairman), H. H. Waters, J. Fry, R. E. Townsend, H. Caldicott, J. Sharpe, J. G. Rogers, A. Green, R. M. Hackett, J. Caldwell (Hon. Sec.), and two visitors.

STRAWBERRY CULTIVATION.—The Hon. Secretary read a paper on this subject as follows:—

The first matter of importance is the choice of the soil. In my opinion the most suitable soil in this district for strawberries is of a red loam, with a good stiff clay subsoil; the stiffer the clay the better. They will also do fairly well for a few years on any ironstone gravel, having a good clay subsoil, provided the position is suitable and they are liberally manured. The best position for most kinds of strawberries is one facing towards the morning sun with a shade from the afternoon sun. The kind most successfully grown in this district is the Marguerite, both on account of it being a good cropper, coming in fairly early, and also that it lasts in the ground longer than most kinds. The Riffloman does fairly well, but requires a moist sheltered place. The Paxton is a good strawberry for packing, and bears fairly well in suitable soil. In planting, only strong healthy runners should be selected, and they should be as near as possible of one kind, so that they will all ripen together, and last in the ground the same length of time. In my experience the best time to plant them out is in April with the first rains, or the beginning of September, where the soil will keep moist through the summer. The roots of the plants should be trimmed off to about 2in., and, when setting in their places, it is well to spread the roots out, which I do by placing one finger underneath the plant in the middle of the roots while putting the earth in. Where it is the intention to use the horsehoe, the rows should be at least 2ft. 6in. apart and 18in. between the plants; but on steep banks, where the use of the horsehoe is not possible, they do well at 2ft. x 18in. Where the ground is of rich red loam, very little (if any) manure is required, as the application of bonedust has a tendency to encourage undue growths of weeds, which are very apt to do more harm than good. In poorer soils a liberal application of bonedust or superphosphate has a very beneficial effect. I find the use of the 1lb.-punnet a great help in marketing the fruit. I generally start at the bottom of the row with half a dozen punnets inside of one another, putting them down as they are filled, with a few leaves over them to shade them, and picking them up coming back, and putting them in the crate out of the sun. I have often heard people remark how much nicer the strawberries that came fresh out of the

garden were to those that were obtained from the shops in the town, the reason being that the latter are either picked before they are ripe or are knocked about in a big box till they are scarcely recognisable. I think that the consumption of this delicious fruit could be very much encouraged by the exercise of a little care in picking and packing, and it would pay us well to do it.

Mr. Vickers thought the bushes grew too rank on red loam; he preferred gravelly soil. Some years ago his strawberry plants were attacked by disease, and he had to give up growing them. Mr. A. Green agreed with Mr. Vickers as to red loam for strawberries. With him they had done best where they got the afternoon sun. Mr. Caldicott, on the contrary, favored red loam for strawberries, while Mr. Waters said the best he had ever seen were Paxton's and Surprise on a white sandy loam; he preferred an aspect where the plants received the morning sun. Mr. Townsend thought a great deal depended upon the position. He believed a new strain of strawberries from a distance would be an advantage occasionally.

QUESTION BOX.—Several questions were asked through the question box, and the following information elicited:—To keep onions in good order grow a good keeping variety, and store in a cool dry place. If they are not stored too thick, and the place is well ventilated, the onions can be brought in from the field when dry in the heat of the day. Peach trees should have the lateral growths pruned back to two or three spurs. Summer pruning of fruit trees was referred to at the previous meeting. A question as to how to tell the difference between the White Elephant and Beauty of Hebron potatoes was referred to the General Secretary. [These potatoes are often sold under either name. In a report on experiments with 240 varieties of potatoes Mr. H. N. Starnes, of the Georgia Experiment Station, U.S.A., says White Elephant is another name for Late Beauty of Hebron, but distinct from Beauty of Hebron, which he describes as an early large round potato of cream color, while the White Elephant, or Late Beauty of Hebron, is only medium early, medium size, round, and of a buff color.—GEN. SEC.]

Nantawarra, March 27.

Present.—Messrs. E. J. Herbert (in chair), James Nicholls, R. Uppill, A. L. Greenshields, A. F. Herbert, R. Nicholls, T. Dixon (Hon. Sec.), and six visitors.

FEEDING GRAIN TO STOCK.—A discussion took place on this subject, arising from suggestion from Inkerman Branch. Members agreed that grain could profitably be fed to pigs and poultry at present prices.

SEEDING.—The time to sow different kinds of wheat was discussed. Mr. R. Nicholls favored sowing the later ripening varieties first, then the early ones. If the latter are sown too early they ripen at a time when they are very liable to damage from rough weather. He asked whether if it continues dry it was advisable to plough or scarify the fallow before sowing. Members thought a lot depended upon the class of land and the state it was in. It was almost impossible on stiff clay soil to get enough loose soil to cover the seed after the drill unless it is worked beforehand, whereas on some loose soils, as well as sandy land, little would be gained by working it first without rain.

POULTRY COMPLAINT.—Mr. E. J. Herbert reported that some of his fowls were out of sorts, and their combs had gone off color. He added a little sulphur to some pollard, and afterwards some lime, and although some fine birds had died the old birds had improved, while the young chicks were not injured.

CEREAL EXPERIMENTS.—Mr. A. F. Herbert tabled Banner oats from Bureau seed. They had done fairly well, though sown late, and the grain was better than the original he received from the Bureau.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Organised Labor.

The report on trades unions which has just been issued by the Labor Department of the Board of Trade is, in some respects, fuller than any of its predecessors. The statistics given relate to the year 1897, with comparative figures for the years 1892 to 1896. This period, especially the last three years of it, has been one of remarkably flourishing trade. We are extremely glad to see that the trade unions, looked at as a whole, were in 1897, as no doubt they are still, in prosperous condition. The best single test is membership. In 1892 the total trade union membership was 1,500,451. Hence it declined steadily to 1,404,898 in 1895, and has risen since then to 1,609,909 in 1897. Out of this last total no fewer than 1,059,609 members belong to a hundred "principal unions," the great permanent regiments of industry; the rest, or 550 300 persons, belong to 1,187 organisations, many of them very small. The total income of the 100 leading unions was, in 1892, £1,455,885, and in 1897 £1,981,971. Their total reserve funds in hand amounted, in 1892, to £1,618,790, and in 1897 to £2,273,619. These figures are the more satisfactory in that the period covers two of the severest and costliest labor conflicts on record, that of the Miners' Federation and that of the Amalgamated Engineers.

Friendly societies and the distributive and wholesale co-operative societies are, in their way, monuments of what can be done by the practical organising genius of the English race—practical genius touched by the spirit of idealism; but trade unions have had greater difficulties to contend with, and have won a greater victory. They were born and shaped in that time of storm and stress when the fortunes of the English artisan were at their lowest, when industry had been revolutionised by invention, and the old social and legal protections, which had sheltered him since the reign of Elizabeth, had been swept away by the rising tide of economic liberalism. The new societies had for years to carry on their vindication of a fair share of labor in the common receipts of industry under the guise of "unlawful combinations in restraint of trade." It was not until the legislation of 1871 that they finally were released from this category, and even then they were left bound by some jealous restrictions. Just as nations are born and at first moulded under the influence of the necessity of self-defence, but afterwards develop institutions designed for pacific ends, so has it been with these industrial commonwealths. Their primary function has always been the protection of the individual workman's interest as against employers, but they have subsequently provided for his other great risks and dangers. A member of a fully-developed trade union, like the Amalgamated Engineers or the Boilermakers, is assured against all the main contingencies of this troublous life. He is guaranteed by the services of a skilled and vigilant executive that he will obtain the best wage rates and shortest hours of labor that the condition of the trade will allow. He is maintained by his society if he is thrown out of work for a time by slackness of employment or if he is sick, and then he is superannuated. This is much; and there is no reason why a trade union should not also become an association enforcing the highest industrial morals, ensuring sound and honest work, and promoting technical education and general higher knowledge among its members. All this, however imperfectly it was carried out, certainly entered into the ideal of the mediæval guilds. Not many labor organisations attain to this ideal; some have actually worked

against it, but there is nothing to prevent their attaining it if their members so desire.

It appears that out of nine and a quarter millions spent during the years 1892-97 by the 100 principal unions, only about two millions were spent on "dispute pay," while nearly five and a half millions were paid away in friendly benefit. There is, we think, no reason to doubt that, on the whole and in the long run, and in spite of occasional great conflicts, one effective organisation of workmen, and consequently of employers, tends to the settlement of trade questions by pacific instead of warlike means. Discussion takes the place of strikes and lockouts, agreement and compromise that of victory or surrender. Diplomacy is substituted for war. Occasional negotiations have even been replaced here and there by the formation of standing councils or parliaments of industry, representing both the capital and labor of a trade, like the Northern and Midland Iron and Steel Trades Boards. At this point discussion and agreement almost assume the dignity of debate and legislation. These boards have for years adjusted the most difficult questions without a single strike or lockout. One may almost say that the workmen have, by their collective action, raised themselves from the rank of servants or "hands" at the beginning of this century to that of equal parties at the end of it. As a matter of fact, in the great industries the wage rates and hours of labor are fixed, not between individual employers and their workmen, but by the most formal agreements made between those equal parties—the trade union on the one side and the employers' association on the other. This being so, the question for statesmen in the future is whether the law shall be adapted to the new state of facts. Is it not desirable to enable these associations to acquire legal corporate personality for the purpose of entering into agreements which are not merely, as now, morally binding, but can be recognised like other agreements by courts of law? This step in advance was recommended by a strong section of the Labor Commission, including the Duke of Devonshire and Sir Michael Hicks-Beach, in 1894. Here is a possible work for the constructive statesmanship of the future. Upon this basis alone can be built a complete system of arbitration in trade disputes.

We are reminded by the Board of Trade Report that trade unionism has its limits, flourishing as it now is within them. Sixty-five per cent of the total number of members of the trade unions belong to the metal, engineering, ship-building, mining, building, and textile industries. Eleven per cent. belong to railways, docks, and other transport services: all other industries put together furnish the remaining 24 per cent. Agricultural unions have diminished from the small membership (compared with the total number of these laborers) of 36,986 in 1892, to the almost invisible number of 3,879 in 1897. This points to the eternal natural distinction, as visible 600 or 300 years ago as now in social arrangements, between the workmen who can and those who cannot form themselves into craft-guilds. The report of the Labor Commission pointed out that "when a trade combines the elements of skill, co-operation in the same work of a number of people, and local contiguity, it seems to be easy to convert the natural craft thus existing into a formal and permanent trade union." Without some natural basis of this kind a union may endure for a space, but quickly perishes and fades away. Such has been the fate of almost all associations of quite unskilled agricultural or maritime labor. This distinction in fact indicates a distinction in treatment. If the task of future constructive statesmanship is, in the field of industry where trade unions flourish, to provide facilities by which their action may work the better for the common advantage, a more paternal and protective policy is justifiable and desirable in the case of that multitude who, by the nature of things, are incapable of combining to defend their own interests.—*Saturday Review*,

Government Works in Progress.

Parkside Asylum.—New wards for chronic female cases. This large building is now in the hands of the carpenters, who are putting on the roof, and will, in a few months, be ready for occupation. The Government have decided to proceed with the erection of a still larger building, for which the foundations have already been put in.

The Art Gallery.—This building is now being roofed, but many months must elapse before it is out of the hands of the contractor. This contract has been a great help to a number of stonecutters who, of late years, have not had sufficient employment in Adelaide to keep them at their legitimate trade.

Adelaide Hospital.—The proposed additions will give employment to a large number of brickmakers, bricklayers, and a few stonecutters. The work was started on the 20th of March. The money for these new buildings is provided by the Commissioners of Charitable Funds.

The Adelaide Railway Station.—The work in erecting the new platforms and station is now in full swing, the huge blocks of granite being dressed into shape by the artisans, and the concrete borders of the platforms are being put into position and the spaces between filled up with sand and gravel, which, when asphalted, will form a complete and solid platform.

Government House.—This old building is now undergoing a thorough overhaul. Workmen are coloring, washing, and painting the exterior, whilst the various rooms are being repapered and made fit for the reception of the Governor, his staff, and numerous retinue of servants. The Hon. the Chief Secretary, attended by the Superintendent of Public Buildings, recently inspected the work now in progress.

The Labor Bureau.

The Superintendent of the Labor Bureau reports that since the establishment of the Bureau he has provided employment for 1,690 men. Since January the 4th 1,132 men have been set to work. The Bureau is doing good work, and it is intended to introduce improved methods, which will be appreciated by the employés.

The last call for men produced a very fine stamp of South Australian workmen, with a few exceptions.

Notwithstanding that some of the men professing to be out of work had, at the street corners, proclaimed that hundreds of men who had registered months ago were still out of employment, yet when fifty men were required for an important work only thirty of the men applying had two months' seniority on the Bureau register. Good men seldom have to seek long for work at the Bureau.

The Management of Machinery.

BY INSPECTOR BANNIGAN.

In this article I purpose dealing only with such matters as may concern the safety of employés and attendants on engines and gearing for the transmission of power to the various machines usually employed in factories.

The accidents caused by the engine, apart from those which occur through the escape of steam, or through the fracture of certain portions of the mechanism, are occasioned chiefly by the slipping or falling of people on the floor, staging, and steps of the engine-room, or in the foundation wells, or else

through contact with certain mechanisms during resumption of work or during normal work, and especially when the cleaning, oiling, or repairing of certain parts of the engine are in progress. It is therefore of the utmost importance that the attendants should be able to move freely round sections of the engine to regulate and oil the same, and be able to verify their work without running any risk.

In the case of large engines, if the flywheel revolves in a well, or only slightly above the level of the floor, it should be fenced with an iron or wooden railing to a height of about 3ft., the rails of which should not be more than 3in. apart, so that in the event of a fall no member of the body could pass between them. A skirting, which can be made of an edgeway board 4in. or 5in. high, or of an angle-iron bar, or even of a rod fastened to the railings at an elevation of 2in. above the floor, would protect the foot from slipping between the rails, and from being caught by the arms of the flywheel. Sufficient space must, however, be allowed to permit of the introduction of a lever to act on the flywheel when work is resumed, so as to overcome the dead-point in cases where no special apparatus for this purpose exists.

The crank and crank discs should be fenced by an iron railing, but care must be taken to give the attendant sufficient room for taking the temperature of the various bearings.

In the case of horizontal engines, where the crank is more than 2ft. above the floor, it will generally be found sufficient to guard the dangerous point by a curved iron plate, so fixed as to enclose the space traversed by the crank towards the extremity of its outward stroke.

Starting the Flywheel.

It is frequently necessary to turn the flywheel, either in order to remove the crank from the dead centres or to make certain parts of the mechanism accessible to workmen for repairs. If this turning is done by hand the engine may be set going through an escape of steam from the shut-off valve, and the workmen engaged at the flywheel may be carried away and severely injured. To prevent accidents of this nature special appliances should be adopted for the performance of this work. Various methods have been suggested, but among the most simple and effective is a starting apparatus used in the iron foundry of Messrs. Forwood, Down, & Co., of Hindley Street, Adelaide. It consists of a half-moon shaped cast-iron boss, made to grip the outer surface of the flywheel by means of friction, and is manipulated by a lever with such ease that a lad could turn the flywheel to any required point. It is fitted with a balance weight, causing the friction-casting to be withdrawn the moment steam has acted on the piston head, thus avoiding the danger so often attendant on the use of loose iron bars as starting levers.

Oiling.

The various parts that need lubrication should, if possible, be provided with automatic oil feeders, so that the attendant may not come in contact with the movable mechanisms, except when the engine is at rest. The crank pivot especially requires the greatest care in this respect. The many appliances used for the automatic lubrication of engines are so well known as not to need describing here. I may, however, briefly refer to one method, which is both simple and effective. It consists of an oil reservoir, with wick placed over the highest point attained by the connecting rod, and fastened to the cover of the main cushion by means of an iron rod in the shape of an inverted L. A box is situated on the connecting rod, and passes at each revolution under the wick of the reservoir, and the drops of oil carried away each time collect in the box and flow to the crank pivot.

Accidental Resumption of Work by the Engine.

Through the action of the counterweight of the crank or of the connecting rod, and especially in the case of condensing engines, by the rarefaction of the air in the cylinder, a steam engine may set itself going unexpectedly after it has been stopped, and may make as much as one-half or three-quarters of a revolution. Owing to the action of the flywheel on the transmissions the number of revolutions of these, in such a case, would be sufficient to place in great danger the workmen engaged in cleaning, oiling, or repairing the machines or transmissions. To prevent such accidents the flywheel should be arrested, either by means of levers in the case of small engines, or of a brake, which can be constructed of a block of hard wood, and fastened to the floor or a cross beam by means of an iron support, and operated by a screw and hand-wheel, which presses the block against the outer surface of the flywheel sufficiently to prevent the latter from moving.

Belts, pulleys, and gearing for the transmission of power from the engine to machines, &c., will be dealt with in next issue of the *Journal*.

The Mining Industry.

The *Australian Mining Journal* recently published a leading article entitled "South Australian Outlook," prompted by the recent rise in the copper market; and as the statistics quoted are in so concise a form and of such value to those interested in copper mining, it is proposed to quote from this article, leaving until a future time some information and remarks relative to the mining industry and the labor market. "South Australia, a colony so very largely dependent on copper production, may well measure its chance of progress by this one standard. Thus from 1850, the year in which its copper exports first attained to large proportions, to 1878, when falling prices gave the first check to its production, it enjoyed a healthy prosperity. For thirty years the great Burra Burra Mine, discovered in 1845, continued its splendid output. It yielded an aggregate of 51,622 tons of copper, valued at £4,749,224, equal to £92 per ton, and on a capital outlay of £12,320 it paid £800,000 in dividends. But while the fluctuations in copper values have sadly militated against the steady progress of the colony, the rates ruling from 1889 onward simply knocked the bottom out of its chief mining industry. In June, 1872, copper realised as much as £112 per ton, whilst in December, 1886, it stood at £44. At the end of 1887 it had risen to £70, and in September, 1888, to £93. Six months after, due to the collapse of the *Société de Métaux*, which had attempted to corner the supply, it was down to £43 per ton, and in June, 1894, it touched the still lower rate of £41 10. As this did not meet the cost of production, with shipping, interest charges, and other expenses added, the South Australian copper industry declined to a low ebb, but now, under the influence of reviving prices, it is preparing to enter on a new lease of vigorous life. That the country is magnificently rich in this form of natural wealth stands on indisputable record. It is attested by the history of such mines as the Burra Burra, the Moonta, and the Wallaroo. It is to be seen in the rich copper lodes which have been located and worked in a score of widely-separated localities, and it is further avouched by the fact that of total Australasian copper production to the end of 1896, valued at £27,673,560, South Australia has supplied 76 per cent., valued at £21,037,972. Encouraged by the rise in values, which promises to be fairly maintained, those interested in the industry are again taking active steps to preserve and improve this ascendency. 'But will the prices be sustained?' is the inquiry rather anxiously

put by those interested in copper mining. This is a case in which it is only safe to prophesy after you know, but it is permissible to say that the surrounding circumstances decidedly point to an affirmative. There may be market fluctuations; still, the prospect is more in favor of a general improvement than a general decline."

Special Trades Union Congress, Manchester.

The special Trades Union Congress which was convened at Manchester for the purpose of discussing the question of the general federation of all trades unions has, after three days' debate, adopted, with very little amendment, the whole of the scheme of federation prepared by the committee appointed by the Birmingham Congress in 1897. The Parliamentary Committee of the Trades Union Congress appointed at Bristol last year will act at once as a provisional management committee of the "General Federation of Trades Unions" which it has been resolved to constitute, and its main business will be to call a general council of the new federation not later than July next. The scheme of federation has, therefore, now taken a thoroughly practical shape, and it has become a matter of the greatest interest to all who feel any concern with labor problems to consider the nature of the organisation which has been decided upon. The gist of the matter lies in the first two or three rules, which naturally provoked a good deal of discussion, but which were finally adopted in their original form. The governing body of the federation is to be styled the general council, and is to consist of two delegates from each union coming into the scheme. The qualification for a delegate is that he must either be actually working at the trade he represents at the time of his appointment, or else, having been a *bona fide* worker at the trade he represents, be at the time of his appointment a permanent paid working official of his union. But the real executive is to be not the general council itself, but a management committee of fifteen members to be annually appointed by the general council, apparently from its own members, subject to the proviso that no one trade shall have more than one representative on the committee. It seems a probable result of this scheme that the general council will almost entirely consist of permanent paid working officials of the unions, and it is almost certain that the management committee will consist wholly of such officials. This was probably inevitable, and perhaps is not wholly undesirable; but it carries with it the possibility that neither the management committee nor the general council may truly represent the real feeling of the members of the unions, and nothing would be more deplorable or more ruinous than that the control of an organisation of this kind should fall into the hands of a clique of busy agitators. The objects of the federation are defined as being to uphold the rights of combination of labor, to improve in every direction the general position and status of the workers, to secure the consolidation of labor as a whole, and unity of action among all societies forming the federation, and to promote industrial peace by all amicable means, such as conciliation, mediation, references, or the establishment of permanent boards to prevent strikes or lockouts between employers and workmen, or disputes between trades and organisations, and, if these differences do occur, to assist in their settlement by just and equitable methods. All this is most laudable, and any organisation which would steadily and sincerely pursue these objects would be welcome. But there are other objects of the federation, not expressly stated, but to be gathered from the powers vested in the management committee, and the pursuit of these last would be by no means necessarily beneficial.

The management committee is to have power to discuss and advise upon the various questions which may be submitted to them by the societies federated, and to appoint deputations to visit the parties involved in any difference to

negotiate, with a view to a settlement previous to a dispute taking place. So far well, but the next clause provides that the committee may grant benefit under the federation scale to the extent of 1 per cent. of the aggregate number of the members of the federated societies. Benefit means strike pay, and the federation scale means 5s. or 2s. 6d. per week, according to the rate of contribution paid by the society concerned. It is a significant fact that a minority of the Special Congress wanted to limit the powers of the management committee in relation to disputes to the disbursement of strike pay only; and in any case it is evident that this subsidising of approved strikes is regarded as one of the most important objects of the federation. The committee, indeed, have no power to withhold strike pay until the dispute has been in progress for at least eight weeks, and at the end of that time the only discretion given to them is to continue to pay it so long as they think any good can result from the further continuation of the dispute. It is only when more than 1 per cent. of all the federated unionists are involved in a strike or lockout that there is any appeal, even to the general council, whether the payments are to be made or not; and in no case at all does there appear to be any appeal from the general council's decision. This automatic provision of the sinews of war seems to be a strange method of securing industrial peace. The committee's power to intervene between employer and employed is much less readily available; and yet it is only by using power of that kind that it can hope to do any real good. We are willing to believe that the contrivers of the scheme sincerely hoped that the chief weapon of the federation would be conciliation, and its chief employment the moderation of disputes; but it is certain that many of those who have approved of it see in it rather the means of making any strike upon which they may choose to embark irresistible. Very much must necessarily depend upon the kind of men who first get hold of the machine; but even if they should have the best intentions in the world, and excel in all the persuasive arts of mediation, they will find themselves sadly hampered by their entire lack of control over the strike subsidy. But it will take many years of comparative peace before the federation will have accumulated sufficient funds to maintain an important strike for long, and perhaps before the end of that time the good sense of the workers will have found a better use for them.—*Morning Advertiser.*



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[A NEWSPAPER. VOL. II.]

NOTES AND COMMENTS.

In our issue of September last we quoted figures showing the work done in the Mackay district, Queensland, to cope with the grub pest of the sugarcane. It was found that the only practical treatment was to trap the perfect beetles, and in order to encourage this work funds were raised by the cane-growers and millowners, and payment made at the rate of 6d. per pound for all the beetles caught. In two years 30 tons of beetles were paid for at cost of about £1,000, and representing about 17,000,000 beetles. It was suggested that the wheat and grass grub pest on Yorke's Peninsula and elsewhere should be combated in the same way, as it is not possible to do anything while the grubs remain in the soil. Although it has been frequently affirmed that the beetles collect in large numbers round trees, bushes, &c., this suggestion was ridiculed by many practical farmers as being all very well for newspaper farmers. It may interest these gentlemen to know that the latest report from the Mackay district is to the effect that this year the grub pest has fallen very flat, diminished catches being the rule, and the beetles far from numerous, and it seems that, judging by results of last year's operations, the pest has been got well under hand.

The satisfactory returns received during the past two or three seasons from crops put in with the seed and fertiliser drills has resulted in a very marked increase in the demand for fertilisers and drills. The result has been that the vendors of fertilisers have been unable, for several weeks past, to accept orders for superphosphates, and now they have difficulty in supplying the demand for other classes of phosphatic fertilisers. The active demand has naturally resulted in a sharp rise in prices, and fertilisers that would otherwise have been difficult to dispose of meet with ready sale owing to scarcity of other lines. The increase both in local manufacture and the importations of fertilisers has been very considerable.

Phosphatic manures applied to pastures increase the vitality of the plants thereon, causing them to greatly add to their starch and sugar constituents. This makes the herbage far more agreeable to the animals feeding upon it, and they, in turn put on a great deal more flesh and fat. As much as half a ton of good basic slag (otherwise known as Thomas phosphate) may be profitably applied to an acre of pasture. Some samples of basic slag contain hardly any phosphoric acid, whilst other samples are very rich. It behoves every purchaser, therefore, to demand a guaranteed statement of analysis of basic slag—Thomas phosphate—or any and every kind of fertiliser purchased. Every person selling fertilisers is required by law to furnish each purchaser with such analysis, whether asked for it or not.

Under the brand of "Kooyana," the Broken Hill Proprietary Company, Limited, manufacture an excellent bluestone (sulphate of copper), guaranteed to contain 25 per cent. copper. It should be satisfactory to all farmers to learn that both this brand and that of "Wallaroo," mentioned in the April issue of this journal, are quite reliable, and equal in strength and purity to the very best that can be manufactured in any part of the world. The editor of this journal will be pleased to be provided with samples of the so-called "colonial" bluestone, with particulars of the name of the vendor, the brands and marks on the original packages (most probably imported), and, if possible, the name of the manufacturers.

A new form of implement, called "Light Lap Cutaway Disc Plough," has lately been shown in the eastern colonies. The discs number up to twelve, and are scolloped on the cutting edge. The frame to which the discs are attached carries a force-feed seed drill, but no manure drill. The implement ploughs (or turns over the soil), harrows, and sows seed at one operation, and it is claimed that six to ten acres a day can be treated with four horses.

Glassware for fruit, &c., is likely to become very cheap soon, in consequence of the invention by Frank McNeal, U.S.A., of a process of blowing tumblers, jars, and other articles, by machinery. Each machine can turn out 1,200 articles per hour, and hundreds of men have been thrown out of work. The invention is controlled by four companies.

The Americans have adopted another word for the practice of adding "preservatives" to articles intended for human food. They call it "embalming." In former times our people were able to make wine, beer, jams, &c., butter, cheese, and all other articles of food, in such a way that they would keep good for a considerable time; but, nowadays, nearly everything we eat or drink is "embalmed" with some drug or other substance which, if not actually poisonous, at any rate makes the food positively indigestible, and therefore injurious to the consumer.

Very few people plant more than half a dozen walnut trees, although in most of the cooler hilly parts of the colony, and in the level country of the South-East, these trees would thrive very well. At 30ft. apart, on the septuple system, fifty-five trees could be grown on an acre of land, or forty-four trees on the square system. In time the trees would probably interlace at that distance apart. Old trees produce about 100lbs. nuts each year, but probably half that weight would be a more fair average to go upon. At 3d. per pound the produce would be £17 10s. for forty-four trees, labor of gathering up the nuts to be deducted. The timber would be of very great value to posterity, but the man who plants walnuts can only reckon upon profit from the nuts. Wholesale prices for walnuts up till now have been much higher than 3d. per pound, but we should reckon upon the export value,

Air is as necessary to the roots of nearly all plants (water plants are provided with air through the medium of the leaves) as it is to the lungs of animals. If the soil becomes waterlogged the air is driven forth, and the roots are drowned, so that the plant dies. If the soil is caked down into a compact mass about the roots the air is excluded and the roots are suffocated. The same event follows when the surface of the earth for some distance round the stem of a plant is covered with an impervious coating, such as tar or asphalt, and death is the result. Under-drainage is therefore absolutely necessary in all cases where the soil is liable to become sodden with water, and this may happen even on rather steep hillsides. Loosening of the surface soil to let in a proper amount of air is necessary on nearly every soil, and is absolutely essential where the surface is liable to solidify or "cake" down. Where the plant can find sufficient air and nutriment in depth the roots will descend, but not otherwise. As to whether soils should be cultivated deeply or not depends upon the character of the soil—whether pervious to air or otherwise.

Lime, sulphur, and salt is a favorite spraying compound with American orchardists for winter use. It destroys eggs of insects on the bark, and is effective in regard to red spider—a prevalent pest in this colony. Mr. E. H. Light, in the *Santa Rosa Republican*, kept a careful record of cost of spraying 1,592 well-pruned trees, of twelve to sixteen years old, and found that each tree required nearly 1½ galls. of mixture, costing a trifle less than 2½d., every item included. His spraying outfit cost £3 12s.; 7½ bush. lime, £2 11s. 6d.; 600lbs. salt, 9s. 4d.; 660lbs. sulphur, £2 13s. 6d.; eleven days labor, two men, £6 17s. 6d.; total expense, £16 3s. 10d. The materials made forty-three barrels of 63 galls. each, of 2,709 galls. of mixture.

"If you allow us to sell our wormy apples, it will give the poor an opportunity, which they do not at present enjoy, of using some fruit in their dietary." This is the argument employed by one or two wealthy fruitgrowers who have opposed the codlin moth prevention laws from the very first. This year apples are scarce, and sell at 4s. to 5s. per case of about 40lbs. Ordinarily they sell at 1s. to 3s. per case, accordingly to quality. The poor must be very poor if unable to purchase fruit at such low prices, and must be very hard set if they are content to eat fruit that is filled in the interior with the filthy exuviae of the codlin moth caterpillar. The fruit can be fed to pigs and other inferior animals, or used for vinegar or cider after being cut up and cleansed. The best possible way to check the increase of the codlin moth pest is to absolutely prohibit the sale, gift, or even removal from the orchard of all fruit that has been attacked by the caterpillar, even though it may have left the fruit. When careless growers find they cannot sell their "wormy" fruit, they will either fight the pest or cut down their trees.

To prevent the barking of trees by hares and rabbits the best plan is to enclose the whole orchard with wire netting. But this is not always possible, therefore other means must be adopted. The plan of wrapping brown paper, straw, and other substances is tedious and costly. It is more effective to use a whitewash

brush on the stems and all parts that can be reached by the animals. Procure some blood from a slaughter-house, keep it until a bad odor begins to be developed, then mix slaked lime with the blood till a creamy paste is formed, and apply to the trees.

The army worm (*Leucania unipuncta*) of the American States, is found in Australia and many other countries. It is in its caterpillar stage of life that it causes such havoc in grass pastures and in oat and barley crops. In wheat fields it usually destroys the flag or leaf of the plant only; but it cuts off the whole of the heads of barley and the bells or seeds of the oats. The most effective remedy or preventive yet found is to plough a deep furrow around any field towards which the enemy is making progress, having the wall or land side next to the field. At intervals of ten feet dig holes with perpendicular walls. The caterpillars cannot climb the loose upright walls, and then fall into the holes, where they can be pounded to death. Paris green, mixed with a little sugar in water, and sprayed on adjacent grass will destroy great numbers of the caterpillars.

Women folk in rural districts have not the opportunities which are enjoyed by the sterner sex for meeting outside the narrow routine of their daily lives, and exchanging ideas which would greatly widen their sphere of usefulness. There are many items about the farm or the country home which are closely connected with the domestic work of the thrifty housewife, such as dairying, poultry and bee keeping, preservation of products of the farm, garden, and orchard; the utilisation of substances which are often wasted through want of knowledge of their commercial or domestic value. Much profit is often lost through want of knowledge of how to prepare various articles and products in the best and most attractive manner for the market. It is a great pity that the example set by the women folk at Millicent is not followed all over the colony. Led by Mr. Rowland Campbell they formed a Household Parliament, where they read papers and discuss matters chiefly connected with domestic economy and management. It has often been remarked that "Providence sends food and Satan provides cooks." Good cookery not only makes food agreeable, but makes it also nutritious and health promoting. Women are generally more capable than men of improving upon all things when they find the opportunity, and there is no doubt whatever that were they generally to meet together for such purposes, as are contemplated in the formation of these Household Parliaments, very great good would result. It will be greatly to the advantage of enlightened men folks to take a lead in starting these organisations in every district.

RECLAMATION AT MOUNT COMPASS.

On Thursday, March 9, Mr. George Quinn (Inspector of Fruit) and the General Secretary of the Agricultural Bureau, accompanied by Mr. W. J. Blacker, M.P., Dr. Counter, and Mr. J. Hockney, visited the Mount Compass cultivation blocks, situated on the Black Swamp on the main road from Willunga to Port Victor, and commencing at about six miles from Willunga. The Chairman of the Central Bureau (Mr. F. Krichauff) was unable to attend owing to indisposition.

In the opinion of some people the Black Swamp was long since considered to be capable of great results in production of vegetables and certain kinds of small fruits, as well as of osiers and other economic plants. Trials of a very limited nature had been made by the roadman and one or two others, and, although they were very successful on spots where springs drained from the higher land into the main swamp, yet nothing further was done until the sons of a very successful market gardener at Meadows took up some land on the main swamp, and practically demonstrated the possibility of raising heavy crops without having to construct drains several miles along the course of the swamp. The higher lands on both sides consist chiefly of poor white sand covered with rough scrub. The swamp, when drained, is found to be covered with a thick coat of very coarse fibrous peat, and many of the blockers have burned off about a foot depth of this. It is a pity to have done so, because that same peat would have served to enrich the sandy lands adjacent, and made them equally available for cropping. The swampy land, when drained, requires to be exposed for a season or longer before it will bear good crops, but it improves very greatly as time goes on. Heavy dressings of lime would be beneficial in correcting the "sourness" of the soil and in developing the latent fertility therein. The pioneer cultivator was Mr. T. Callaghan, the road station man before referred to, who started a small plot about thirty years ago. His successor, Mr. George Waye, increased the plot by clearing a few rods more; but Messrs. Wright Brothers took a fair-sized block at a very high premium rental from the lessees under Government, and soon showed the great capabilities of the hitherto despised "swamp." Then vigorous representations were made to the Government and the land was "resumed" for public purposes, cut up into blocks, let on easy terms to industrious men, and now there are about forty families at work making happy homes and growing wonderful crops of onions, potatoes, and many other products.

On arrival at the first block the party was met by most of the members of the Mount Compass Branch of the Agricultural Bureau, who conducted them over the blocks and explained what work had been done and was contemplated to be carried out. Each block contains about ninety acres, of which six to twelve acres are rich peaty soil and the rest sandy scrub land. On this latter part dwellings of a really substantial character are built, together with useful sheds, yards, and other conveniences. On some of the blocks the sandy land is being cultivated to a small extent with encouraging results, especially where the surplus peaty soil has been carted on to it. It is highly probable that strawberries will thrive well there, and apples also may do well if there is sufficient drainage provided to carry off stagnant moisture during the wet season. Where springs exist on the higher lands there are great possibilities for irrigation and intense cultivation in the future. There are about forty holdings on the Mount Compass portion of the Black Swamp, and all of the settlers have done splendid work in reclamation; some have done more than others, but all have done well, and most have raised almost phenomenal crops of potatoes, onions, and other vegetables. The pioneer Wright Brothers have the largest area under cultivation, viz., nine acres, and their methods and example have proved of the greatest benefit to all the other settlers.

After the inspection was concluded the party was divided amongst the settlers who dined them, and then a public meeting was held in the District Hall, presided over by Mr. H. Jacobs. Addresses were given on practical subjects by Messrs. W. J. Blacker, M.P., A. Molineux, and George Quinn, and then the party returned to Willunga, where a public meeting was again held and addressed by the same individuals.

AGRICULTURAL STATISTICS,

TABLE I.—Return showing the Area of Wheat Sown for Grain and for in South Australia, during the Seasons 1897-8 and 1898-9,

Wheat for Grain.						
Division and County.	Area.		Produce.		Average Yield per Acre.	
	1897-8.	1898-9.	1897-8.	1898-9.	1897-8.	1898-9.
	Acres.	Acres.	Bushels.	Bushels.	Bushels.	Bushels.
I. CENTRAL—						
Adelaide	11,606	26,316	70,707	246,904	6.09	9.38
Albert	22,928	31,663	78,769	138,354	3.44	4.37
Alfred	3,680	6,232	6,637	24,696	1.80	3.96
Carnarvon	305	387	1,886	2,668	6.18	6.90
Eyre	101,648	121,212	171,142	518,814	1.68	4.28
Fergusson	73,128	84,823	220,323	637,883	3.01	7.52
Gawler	61,117	92,302	202,516	700,420	3.31	7.69
Hindmarsh	6,595	11,510	49,456	100,510	7.50	8.73
Light	69,861	86,936	377,915	774,333	4.84	8.91
Sturt	69,921	83,520	241,036	435,655	3.45	5.22
Total ..	420,789	544,901	1,420,387	3,589,237	3.38	6.59
II. LOWER NORTH—						
Burna	34,733	41,793	39,544	110,298	1.14	2.64
Daly	186,609	207,011	567,335	1,179,549	3.04	5.70
Hamley	—	265	—	268	—	1.01
Kimberley	31,253	36,436	27,659	33,960	.89	.93
Stanley	93,496	123,802	405,993	883,696	4.33	7.14
Victoria	93,533	114,160	325,462	605,203	3.48	5.30
Young	1,773	3,375	2,439	12,526	1.38	3.71
Total ..	441,397	526,842	1,368,432	2,825,500	3.10	5.36
III. UPPER NORTH—						
Blachford	14,485	15,023	8,005	36,772	.55	2.45
Dalhousie	160,344	170,030	252,069	446,220	1.57	2.62
Derby	—	—	—	—	—	—
Frome	149,710	150,986	294,157	551,010	1.96	3.65
Granville	76,291	74,818	21,366	76,086	.28	1.02
Hanson	26,911	31,390	17,900	56,462	.67	1.80
Herbert	28,571	28,587	10,973	27,052	.38	.95
Lytton	—	—	—	—	—	—
Newcastle	54,062	60,175	47,886	184,700	.89	3.07
Taunton	380	703	860	2,322	2.26	3.31
Total ..	510,754	531,712	653,216	1,380,624	1.28	2.60

SEASON 1898-9.

Hay, and the Quantities of Wheat and Hay Produced, in each County together with the Average Yields per Acre and Average Rainfall.

Wheat for Hay.						Rainfall (Approximate Mean).	
Area.		Produce.		Average Yield per Acre.		1897.	1898.
1897-8	1898-9.	1897-8.	1898-9.	1897-8.	1898-9.		
Acres.	Acres.	Tons.	Tons.	Tons.	Tons.	Inches	Inches
65,796	47,816	65,913	57,228	1'00	1'20	21'375	27'943
3,697	2,658	1,669	2,002	'45	'75	6'275	10'478
1,365	1,000	275	500	'20	'50	5'301	8'528
447	453	520	358	1'16	'79	20'875	18'278
15,797	14,620	7,531	9,858	'48	67	9'224	12'197
24,816	17,127	10,377	11,940	'42	'70	11'042	17'700
55,297	33,043	29,079	30,406	'53	92	11'226	16'872
10,804	7,423	12,051	7,486	1'12	1'01	19'331	22'188
55,242	32,310	42,596	29,181	'77	'90	14'075	20'662
14,240	10,845	9,156	8,057	'64	'74	13'458	17'553
247,501	167,295	179,167	157,016	'72	'94	13'308	17'240
5,368	3,988	2,198	1,713	'41	'43	8'667	10'903
41,596	26,933	17,222	18,304	'41	68	10'965	15'153
518	663	520	516	1'00	'78	5'301	8'528
1,559	820	385	203	'25	'25	9'212	10'700
38,628	23,442	26,035	17,632	'67	'75	15'396	19'836
50,573	34,146	30,941	22,254	'61	'65	12'721	13'720
250	360	552	305	2'21	'85	6'275	10'478
138,492	90,352	77,853	60,927	'56	'67	9'791	12'760
332	925	126	374	'39	'40	6'598	10'075
14,078	12,033	6,529	5,222	'46	'43	8'208	10'357
22,586	19,376	11,588	12,140	'51	'63	4'100	6'485
225	724	87	405	'39	'56	9'974	12'197
220	550	100	200	'45	'36	5'178	7'705
121	346	38	135	'31	'40	4'910	7'180
3,439	4,983	1,608	3,913	'47	'79	4'979	6'826
200	283	50	158	'25	'40	4'166	6'637
41,201	39,220	20,126	22,547	'49	'57	7'338	10'657
						6'490	8'827

AGRICULTURAL STATISTICS,

TABLE I.—Return showing the Area of Wheat Sown for Grain and for in South Australia during the Seasons

Division and County.	Wheat for Grain.					
	Area.		Produce.		Average Yield per Acre.	
	1897-8.	1898-9.	1897-8.	1898-9.	1897-8.	1898-9.
	Acres.	Acres.	Bushels.	Bushels.	Bushls.	Bushls.
IV. SOUTH-EASTERN.						
Buccleuch	3,550	4,040	13,436	15,540	3·78	3·85
Buckingham ..	7,391	11,202	47,829	103,937	6·47	9·28
Cardwell	—	120	—	960	—	8·00
Chandos	—	40	—	180	—	4·50
Grey	8,709	16,735	142,141	268,574	16·32	16·05
MacDonnell ..	2,342	2,612	23,367	30,373	9·98	11·63
Robe	619	3,274	6,829	51,245	11·03	15·65
Russell	7,505	11,702	28,874	54,735	3·85	4·68
Total ..	30,116	49,725	262,476	525,544	8·72	10·57
V. WESTERN—						
Buxton	—	—	—	—	—	—
Dufferin	1,790	1,580	3,470	4,618	1·94	3·56
Flinders	10,411	12,003	49,406	77,096	4·75	6·42
Hopetoun	2,625	2,985	2,648	6,028	1·01	2·02
Jervois	26,497	28,987	99,214	117,106	3·74	4·04
Kintore	19,837	19,042	16,557	30,260	·83	1·59
Manchester	285	355	197	482	·69	1·36
Musgrave	10,775	12,862	33,103	52,678	3·07	4·10
Robinson	25,582	29,012	88,972	122,005	3·48	4·21
Way	21,810	27,664	16,774	45,222	·77	1·63
York	—	1,100	—	2,500	—	2·27
Total ..	119,612	135,590	310,341	457,995	2·58	3·38
SUMMARY.						
I. CENTRAL	420,789	544,901	1,420,387	3,589,237	3·38	6·59
II. LOWER NORTH	441,397	526,842	1,368,432	2,825,500	3·10	5·36
III. UPPER NORTH	510,754	531,712	653,216	1,380,624	1·28	2·60
IV. SOUTH-EASTERN	30,116	49,725	262,476	525,544	8·72	10·57
V. WESTERN	119,612	135,590	310,341	457,995	2·58	3·38
GRAND TOTAL..	1,522,668	1,788,770	4,014,852	8,778,900	2·64	4·91
Increase ..	—	266,102	—	4,764,048	—	2·27
Decrease ..	—	—	—	—	—	—

Chief Secretary's Office, Adelaide, April 6th, 1899.

SEASON 1898-9—continued.

Hay, and the Quantities of Wheat and Hay Produced, in each County 1897-8 and 1898-9, &c.—continued.

Wheat for Hay.						Rainfall (Approximate Mean).	
Area.		Produce.		Average Yield per Acre.		1897.	1898.
1897-8.	1898-9.	1897-8.	1898-9.	1897-8.	1898-9.		
Acres.	Acres.	Tons.	Tons.	Tons.	Tons.	Inches.	Inches.
324	257	177	173	·55	·70	—	—
3,540	2,483	2,386	2,070	·67	·83	14·383	20·600
53	38	53	25	1·00	·66	—	—
6,410	4,662	9,279	6,750	1·45	1·45	23·128	26·284
888	891	1,114	1,035	1·25	1·16	18·881	23·283
2,574	2,364	3,030	2,784	1·18	1·18	19·994	22·406
1,742	1,417	1,271	1,005	·73	·71	11·369	13·911
15,531	12,112	17,310	13,842	1·11	1·14	17·551	21·297
—	—	—	—	—	—	—	—
27	103	9	35	·33	·34	—	—
2,519	2,192	2,078	1,595	·82	·73	14·189	18·362
—	52	—	24	—	·46	—	—
593	1,403	274	834	·46	·60	9·242	10·098
74	130	30	33	·41	·25	6·660	7·725
—	—	—	—	—	—	4·635	7·026
1,672	1,582	698	738	·42	·47	10·458	12·633
1,557	1,852	639	884	·41	·48	10·535	12·123
—	120	—	43	—	·36	8·052	12·650
—	—	—	—	—	—	—	—
6,442	7,434	3,728	4,186	·58	·56	9·110	11·645
—	—	—	—	—	—	—	—
247,501	167,295	179,167	157,016	·72	·94	13·308	17·240
138,492	90,352	77,853	60,927	·56	·67	9·791	12·760
41,201	39,220	20,126	22,547	·49	·57	6·194	8·695
15,531	12,112	17,310	13,842	1·11	1·14	17·551	21·297
6,442	7,434	3,728	4,186	·58	·56	9·110	11·645
449,167	316,413	298,184	258,518	·66	·82	11·191	14·327
—	—	—	—	—	·16	—	3·136
—	132,754	—	39,666	—	—	—	—

L. H. SKOLL, Under Secretary and Government Statist.

CHEDDAR CHEESE EXPERIMENTS.

BY G. S. THOMSON, N.D.D., DAIRY INSTRUCTOR.

Continuing from the report in issue of *Journal* for March, the following will be interesting to all those who are associated with the manufacture of Cheddar cheese. As already observed, the cheeses were made under the trying conditions of high temperatures, together with a more serious circumstance, viz., a faulty milk, the presence of whey showing itself upon the application of heat to the body of milk in the vat. These adverse conditions will approximate to those generally experienced by our cheesemakers throughout the colony. To produce a good quality of cheese with such a combination of difficulties, especially that of tainted milk, is generally accepted as a matter of impossibility, or if attended with success the maker considers himself especially fortunate, and regards the result as one of good luck rather than skill in working. The freedom of milk from contamination with unwelcome germs is the first object of the scientific and practical cheesemaker—in fact, it is only upon such foundation good cheese can be made. With this good foundation, however, many make grave errors in the working processes, basing too much confidence in the good milk, and relying too much upon the apparently confirmed but unreliable practical tests. When dependence is placed on the feel of curd as an unfailing and true indication of acid development frequent errors cannot be avoided where varied conditions of milk and critical seasons have to be dealt with. The three critical points in Cheddar cheese-making, independent of the two vital elements—purity of milk and outside temperature—are the adding of the rennet, running off of the whey, and the period of salting. To arrive at these little secrets careful scientific and practical tests must be made. Returning to the cheese record, and perusing its contents, the reader cannot fail to observe the close similarity of working in the three last makings, but when compared with the first both time and temperature far from correspond. From this one might reasonably accept that freshness of milk is accountable for the variation.

These differences will be readily seen in the following table:—

Date of Manufacture.	Renneting Temperature. Fahr.	Time of Coagulation. Minutes.	Temperature heated to. Fahr.	Time of Heating. Minutes.	Time settled in Whey. Minutes.
5/2	83°	45	100°	60	80
6/2	84·5°	30	100°	50	60
7/2	84·5°	30	100°	60	50
8/2	84°	30	100°	50	50

The reason for the change in the three latter experiments is on account of a starter or culture being used in ripening the milk, thereby obtaining a quicker and steadier formation of acid, along with a controlling influence over foreign bacteria, thus accounting for the bad gases emitted, and the good condition of the curd at the time of salting and hooping. Independent of the culture a great deal of good was accomplished by repeated stirring of the milk in the vat as each supplier's quantity was received. If a current of cold water had been passed around the vat during the period of stirring, much would have been gained in the elimination of gases, and less resistance would have been expended against the action of the culture in imparting more thoroughly its beneficial flavor to the cheese.

The cheeses were all manufactured on the acid system, and the process of working was so arranged that ripening was expected in two months from the date of manufacture, and upon examination of samples of the cheese, the expectations have been realised.

The following is a short account of procedure in making of cheese on the 7th February.—Milk was thoroughly stirred when received into the vat; temperature, 84.5° F.; culture added, at the rate of 2 per cent., and well stirred down; period of ripening, twenty minutes; cutting of curd moderately fine, perpendicular and horizontal knives used, first lengthwise and second crosswise; hand stirring engaged in for fifteen minutes; temperature gradually raised to 100° F.; afterwards curd was allowed to settle. The time of removal of the curd to the cooler was solely dependent upon the hot-iron test, fully $\frac{1}{4}$ in. of acid being allowed to develop. In the cooler the curd was quickly handled, and freely exposed to the influence of the air. At the expiry of fifteen minutes a change of acid seemed apparent. Smell of curd gave a little indication of the effects of whey. Salted at the rate of 2.5 per cent.; brand, Black Horse. Coloring and rennet, Hansen's.

A 12lb. cheese was split up after being kept for two months and five days, and the following is the result of the examination:—Flavor, mild and full, with a trace of foreign taint difficult to catch; clean cutting, not leathery or mealy; color high, but unaffected (excess of color was added for the purpose of studying changes in composition); shape, a little twisted, owing to softening, the effect of high temperature in curing-room; skin, good. After a short time from cutting an inclination towards dryness was observed, owing to a rapid evaporation of loose moisture and other conditions and changes in the cheese.

The percentage of fat averaged was good, and percentages of water and acid were satisfactory. The flavor of the culture was found predominating in the cheese which is a most valuable index to its usefulness.

Cheese made on the 5th.—Sample split, and the following were observed:—Color, beginning to bleach; texture, fair, rather loose; flavor, somewhat dull, unpronounced, and accompanied by a peculiar taint; percentage of fat and acid low; percentage of water, high. Maturity was not altogether reached, but owing to certain chemical and bacteriological changes a further keeping would have been attended with risk. Salt used, Black Horse; coloring and rennet, Barnakos. The condition of texture and flavor resulted from the want of a culture to arrest injurious ferments, and although a check was gained over fermentation, the quality of the cheese sustained a loss in fat and acid, and excess of moisture was left from long delay of curd in cooler.

Dates, 6th and 8th; makings compare favorably with 7th.

Canadian Cheddar Cheese.

On the 12th and 13th of April, 478 gallons of milk were treated upon the above system, and all scientific tests were applied.

Quality and purity of milk were high. After the usual care in acrating the milk temperature was raised to 86° F., when the seconds acidity test was taken, which was twenty seconds. The alkaline test was next applied, and also at different stages throughout the working. Work proceeded with on the usual lines, the scalding temperature being, however, allowed to run to 104° F., afterwards the curd was left to settle, and a sample of whey taken for fat analysis. Additional samples of whey were kept from strainer and press and analysed. The time of removal of curd to cooler was dependent upon the result of scientific test. With an advanced acid, smell of curd and feel by hand gave little or no indication of its condition, and are decidedly unreliable with rich and changeable milk. To my knowledge the most accurate of practical indications of condition of curd is ascertained by the grit on the teeth. Although I have not advocated this, still, I now feel confident that any cheese-maker after a term of self training, guided by the hot iron and alkaline tests, can estimate by the teeth alone the measurement of acidity.

Immediately after the curd was transferred to the cooler thorough stirring was conducted for five minutes; afterwards the curd was allowed to mat for a further period of twenty minutes, and then cut. The square blocks were arranged in rows of two deep, and milling followed after the desired acidity was obtained. Curd was now salted at the rate of 2 per cent. The second cheese was made on the same lines, but cutting was not done so fine, and the scalding temperature was only raised to 99° F. The object in doing this was to compare the difference in losses of butter fat in the whey.

Abstracts from Record of Manufacture.

Seconds Test.	Temp. of Milk at time of Renneting.	Time of Coagulation. Minutes.	Temperature Heated to	Time of Heating. Minutes.	Time Settled in Whey. Minutes.
No. 1 .. 19	86° F.	30	104° F.	40	15
No. 2 .. 20	86° F.	35	99° F.	45	25

Acidity Tests.—Milk before renneting, .19 and .20; whey before breaking, .15 and .14; whey when drawn, .16 and .18; curd whey when taken to cooler, .20 and .28; liquid from press, .7 and .5.

Percentage of Fat in Whey.

	Before Running off.	From Strainer.	From Press.
No. 1 Cheese.....	.30	.35	.5
No. 2 Cheese .....	.25	.25	.35

The excess of whey in No. 1 is owing to too fine cutting of the curd and high and rapid scalding.

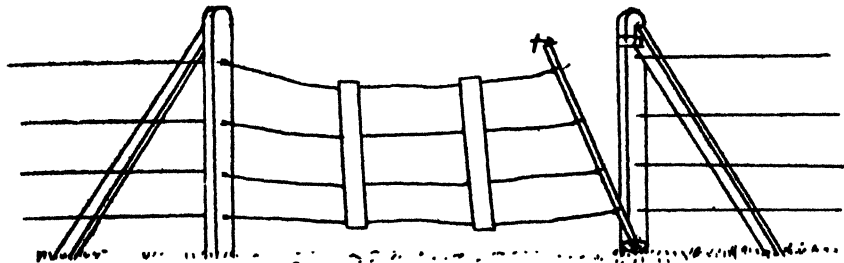
DAIRY BULLS.

The Minister of Agriculture, Hon. R. Butler, has approved of the transfer of six of the Jersey bulls purchased by the department in the spring of 1897, with a view to the improvements of the dairy herds of the colony. The bulls to be transferred are from Clarendon to Mylor, Clare to Port Broughton, Woodside to Mannum, Strathalbyn to Gawler River, Yankalilla to Willunga, and Mount Gambier to Naracoorte. The bull first stationed at Wilmington has been already shifted to Amyton, while the other animal is stationed at the Roseworthy College. Last year nine bulls were purchased by the department and stationed in various centres, making seventeen in all. They comprise a Holstein, three Ayrshires, and thirteen Jerseys. In each case the bull is placed under the control of a branch of the Agricultural Bureau, under regulations providing for the proper care and use of the animal. The bulls are stationed in the respective districts for twelve months, and next year there will be sixteen animals to be shifted. Although only six were available this year the Minister received over twenty applications for them.

ONION CUTWORM.—In experiments conducted at the New York State Experiment Station in fighting cutworms in onion fields it was found that a bait of equal parts of dry bran or middlings mixed with a little Paris green was most effective. The bait was sown on the grass and reeds along the boundaries of the field, and also along the lines of drills. This remedy has several times been recommended for trial in the South-East, but apparently no one cares to take the trouble to put it to test.

SOME HELPS FOR FARMERS.

Slip panels are a great nuisance, and waste a lot of time, besides requiring some trouble to cut the slots in the posts for reception of rails. Several patterns for gates that are easy to make, and cannot sag down if made as directed, have been described and illustrated in this *Journal*; but there are still very few properly-made gates in use. Probably no cheaper, more effective, or simple gate than we now illustrate could be made.



Two strong posts should be put in, say, at 12ft. apart. Brace them with struts, the lower ends of which should prop against the feet of the next adjacent posts. Strain the wires of the fence on either side to the posts, and fix them. Then fix the wires of the gate, as shown in the illustration, on to the wires of the fence, or to one of the posts. At the other end of the wires is a stout round piece of mallee (marked X) or other wood, through which a hole is bored for each wire, and through those holes the ends of the wires are placed and fastened. Two or three strainer bars should be fixed to the wires of the gate. The lower end of the end piece (X) sets into a hole in short stump, as shown, and the other end is to be pulled over till it catches behind a short cleat fixed to the top end of the post. If the fence is rabbit-proofed it will not be difficult to attach wire-netting to the gate, but it would be desirable to affix one or two more bars as well.

HOUSEHOLD HINTS.

CURING BACON.—Ten pounds salt, 1lb. sugar, 4ozs. saltpetre. Mix well. Rub the flitches with it on both sides; place flesh side up, one on the other. Remove the brine. Rub every day for seven days; then once a week for five weeks; then hang up to dry. When dry, place in cool smoke.

SEASONINGS FOR MEAT PIES, SAUSAGES, &c.—Use $\frac{1}{2}$ oz. to each 1lb. of meat. No. 1—2lbs. white pepper, $1\frac{1}{2}$ ozs. cayenne, $4\frac{1}{2}$ lbs. salt. No. 2—5lbs. white pepper, 9ozs. sage, 11lbs. salt. No. 3—4lbs. pepper, $3\frac{3}{4}$ ozs. cayenne, 8ozs. sage, $9\frac{1}{2}$ lbs. salt. No. 4—3lbs. pepper, 1oz. bay leaf, $1\frac{1}{2}$ ozs. basil, $1\frac{1}{2}$ ozs. cloves, 2ozs. pulverised nutmeg, $1\frac{1}{2}$ ozs. cayenne, 7lbs. salt. No. 5—6lbs. pepper, 6ozs. cinnamon, $4\frac{1}{2}$ ozs. cayenne, 13lbs. salt. No. 6—1lb. pepper, $\frac{3}{4}$ oz. cayenne, $3\frac{1}{2}$ ozs. nutmeg, $2\frac{1}{2}$ lbs. salt. In each case to be well mixed. For household purposes much smaller proportionate quantities of each ingredient will be needed.

KALSOMINE.—For each 6lbs. zinc white or Paris white 4ozs. clear glue is required; soak the glue twelve hours in 1qt. warm water for each 4ozs. needed; then add another pint of water, place in a can within a cauldron or boiler with hot water and stir the glue till it is all dissolved. Then mix the zinc white or Paris white with water in a pail till it is like cream in consistency, add the dissolved glue, stir well, and it is ready for use with a whitewash brush. A little Prussian blue and lake will give it a French-grey color. Slate color may be secured with Prussian blue alone.

EXTRA STRONG CEMENT.—For cementing glass, delf, stoneware, or affixing shells to cardboard, or mending joints, &c., pulverise 4ozs. clear gum arabic and dissolve in $\frac{1}{2}$ pt. water; then dissolve 3ozs. white starch, and 1oz. crystal or lump sugar in the gum solution. This mixture should be put into a can and placed in a saucepan of water kept boiling. Stir the mixture whilst the other water is kept boiling until the starch becomes clear. If too thick, as it most probably will be, add boiling water until the cement is as thick as tar; keep stirring till clear. Add $\frac{1}{2}$ oz. gum camphor to keep cement from spoiling, and keep in close jar or bottle.

WATERPROOF CALICO.—To make calico covers for hay, &c., waterproof, take 12pts. linseed oil, 4ozs. sugar of lead, 1lb. white resin; grind the sugar of lead with a little oil, then add the rest and the resin; stir the whole well together in a large iron pot over a gentle fire until thoroughly incorporated; then stretch the calico over a frame or floor, and apply the mixture hot with a large brush.

POULTRY NOTES.

By D. F. LAURIE.

All who wish to have a successful breeding season should lose no time in putting everything in working order. All yards, houses, coops, chicken runs, incubators, brooders and apparatus generally should be attended to. During the busy part of the season there is little time to provide additional accommodation, through lack of which much inconvenience is occasioned and loss incurred. It is especially important to decide at once all questions relating to the stock, whether of breeders or layers. Old hens, or those which have proved to be poor layers should be got rid of, also superfluous stock of any sort. The flocks of laying hens should consist of healthy birds, not over two and a half years old. The best results are obtained when not more than from thirty to fifty hens are in one flock. They are then more easily managed, there is a fairer division of food, and a better estimate of the productiveness of individuals can be formed. Each bird must be kept for a definite purpose; if one proves inferior it is only waste of time and food to attempt to extract a profit from that bird. As regards hens kept for laying, male birds will not be required—they consume valuable food, occupy the space of a hen, and infertile eggs are far preferable in every way, and would doubtless be preferred by the packers and preservers. Where birds are selected for stock breeding, either to replenish the yards or for sale, only the best specimens and perfectly sound in health should be kept. As the male bird gives constitution to the progeny, it is important that he should be of good constitution, young, and vigorous; old, worn out birds will not sire healthy, hardy chickens. Unless the same breeding stock is to be bred from as was used last season, it may be necessary to obtain a change of blood. In-breeding is an evil practice, and is responsible for much want of success. Perhaps under some circumstances it may answer to a limited extent, where the show pen only is concerned, or where an attempt is being made to fix some desired point when only a limited number of suitable stock is available. But with utility points, and where we wish one section to be prolific layers, and the other breeders of fine table birds, in-breeding must be rigidly refrained from. Within the next month or so will be found the best time for purchasing fresh stock. Breeders are now selecting the birds they intend to keep for various purposes, and are in a position to sell at reasonable prices. It is a wrong idea to think that any bird bred from pure stock is a perfect specimen of the breed, or that it will, when bred from, give the desired results. If a breeder of repute is communicated with and the

exact requirements stated the purchaser will receive fair treatment. When specimens of the laying breeds are required, it is important to state that the desired bird must be of a *good laying strain*. As previously stated many hens, even of the noted laying breeds, are poor performers, at the same time some of the finest show specimens are bred from noted laying strains. Breeders of what are termed "utility" breeds of poultry are throughout the world paying marked attention to the different utility points. For instance, take the Minorcas. We see far better show birds at the shows than ever we saw previously, and on the other hand it is an acknowledged fact that the laying powers have been increased, and through careful attention to all points a bird of far more practical value is now available. It will be seen that the layers must be bred from good layers. At the same time, while for utility purposes, a crack show bird is not necessary, the various distinctive points of the breed should not be disregarded. Minorcas in the colony of excellent quality are obtainable now at prices within the reach of every one. Really good Leghorns and Andalusians are not so plentiful. In selecting stock to breed table poultry the question of a high laying average is not of first importance; what is required is quality combined with size and stamina. If a person has a number of white-skinned, plump, square-bodied hens of moderate length of leg, but having long keels (or breast bones) very fair table birds will result if five to seven of such hens are mated with a vigorous Dorking or Indian Game cockerel. Where, however, a fresh start is to be made I prefer using pure stock, as the results are better and more certain. Thus we may place hens of the following breeds in order of excellence for mating with a Dorking cockerel. Indian Game, Orpington, Langshan, Houdan, Wyandotte, and, for extra quality but less size, the old English Game. If the old English Game were procurable they would cross with the same breeds as the Indian Game giving finer quality, whiter flesh and skin, at the expense of a slight loss of size. These are the Dorking, Langshan, Orpington, and Wyandotte. Of the foregoing breeds a fair number of Dorkings are to be had, but large, long-breasted, square birds must be insisted on. Good Langshans are plentiful, but beware of course, heavy sleepy-looking specimens of the Cochin type, they are poor doers, and have, as a rule, short keels and carry no meat. As regards ducks we are well abreast of the times, and Pekins, Aylesburys, Rouens, and Indian Runners of good quality are to be had, and there is no necessity to go outside the colony. Those who wish to breed a profitable duckling will find the cross between Pekin and Aylesbury a quick-maturing large bird, carrying a great weight of flesh of fine quality and flavor. This cross is very highly recommended by many authorities. Geese do not get sufficient attention—the majority of birds available last Christmas in the Adelaide markets were not creditable to our breeders—the finest goslings did not equal in weight many a show duck. Breeders keep on year after year with a lot of miserably small common rubbish, and never a change of blood. It is not good enough to pay 5s. or 6s. for a 6lbs. gosling, all bone and offal, and not a decent meal for three. Such birds are quite unfit for export. A few breeders have some fair Toulouse geese, but they do not make much headway. A great improvement would follow the introduction of pure ganders of large size, and not under two years of age, mated with the largest obtainable specimens of common geese. Young birds should not be bred from, the stock soon deteriorates. The same remarks apply to turkeys. I think a fair number of good American Bronze turkeys are obtainable here. Like geese, for the export market, they must be large and yet young—small specimens would not pay expenses. The same with incubators—these should always be ordered early, so as to hatch out chicks and ducklings when broody hens are not to be had. I shall be pleased to give any information to readers who enclose a stamped envelope for reply.

KILLING POULTRY FOR MARKET.

Soon the marketing of dressed poultry from the country districts will commence. It is not everyone who knows how to kill the various kind of fowls ; therefore the following hints will be useful :—Keep the birds without food or water for twenty-four hours previously to killing, because the fermentation of food in the craw and intestines causes decay in the body of the fowl. Just before killing give them a little water and keep them quiet. Break the necks of turkeys by taking the legs in the left hand and the head in the right, with the back of the bird upwards and the crown of the head in the hollow in the hand. Hold the legs against the left hip and the head against the right knee or thigh, then strongly stretch the neck ; at the same time bend the head of the bird suddenly backwards, to as to dislocate the neck close to the head. This kills the bird instantly, although the body may work convulsively for some time longer. Some people prefer to use the knife as follows :—Hang the bird up by the legs, after crossing their wings to prevent struggling ; give it a sharp blow on the back of the head with a stout piece of wood to make it insensible ; then pierce the brain through the roof of the mouth, cutting it along the entire length ; leave the bird hanging to drain all the blood out. Ducks and geese are killed by driving a knife crosswise through the roof of the mouth well into the brain. Fowls or chickens should either have their necks dislocated, or cut the brain by inserting a two-edged knife into the slit in the roof and cut along the entire length of the mouth, after tying the legs and laying the bird on its back on a bench. Hang the fowl for a few minutes to drain off the blood.

NOTES ON VEGETABLE-GROWING FOR MAY.

By GEORGE QUINN.

The fine soaking rains experienced early in April gave promise of a good season for vegetable-growing in many parts of South Australia, but the lengthy spell of dry weather which followed has had a restraining influence upon the growth of early-sown or planted crops. In many instances the cabbages and cauliflowers have begun to suffer severely from the attacks of aphides and the green caterpillars of the silver-lined cabbage moth. These almost invariably thrive under conditions of drought sustained into the late autumn. Probably before these notes are in print rain and cold will check these pests, but I would strongly recommend any grower who may read these notes, when these pests appear, to attack them at once either with a solution of tobacco wash and soap, resin wash, kerosene emulsion, or tar water, used as a spray, before the plants are injured beyond recovery. Rain and changes of temperature may arrive too late to rescue the plants if left alone. Early crops of these vegetables are generally valuable and worthy of an effort being made to save them.

Thin out the plants of carrots, turnips, and parsnips where they have come up thickly. This will also apply to beets, radishes, lettuces, and spinach.

The ground between the rows of potatoes should be constantly stirred, and, if the grower desires, the plants could be hilled ; but exact tests made show that when the soil is kept in a proper condition there is nothing gained by "hilling up." I have tested this over a space of a few rods only, but no difference in yield could be noticed. Tubers planted at a shallow depth appeared to benefit by "hilling."

Continue transplanting cabbages, cauliflowers, onions, kohlrabi, Brussel's sprouts, leeks, lettuces, and keep the surfaces of the beds well stirred with hoe or fork. All growing crops will be benefited by dressings of quickly-dissolving

manures, such as sulphate of ammonia, superphosphate, Peruvian guano. These should be thinly sprinkled along the rows and hoed in. Two or three light dressings are preferable to one heavy dressing.

As soon as the stems turn dry and the seeds begin to redden the tops should be cut from asparagus plants. If this is not done the bed will be full of seedlings next year, to the disgust of the grower. These beds when pruned should be top-dressed with rotten stable manure and a good sprinkling of salt.

Peas should be staked off the wet ground, otherwise they are attacked by diseases and rot. In small gardens, if brush stakes are not available, wire netting 2ft. 6in. high, fastened to stakes 6ft. apart, act as a good support. If late tomatoes are required the foliage should be trimmed away and the sun admitted upon the fruits, or these latter may be gathered and placed in a sunny dry position to ripen. Keep celery well banked up to blanch the stalks. Coarse paper should be wrapped around to prevent earth gaining access between the folding leaf stalks. Gather good specimens of tomatoes and cucumbers for seed. Get all melons and trombones, &c., under shelter before the ground becomes wet and sodden. Make sowings for successional plantings of onions, cabbages, cauliflowers, broccoli, leeks, and lettuces, and in open rows of broad beans, carrots, parsnips, prickly spinach, cresses, radishes, etc.

All old stems of tomatoes, melons, French beans, &c., should—if no disease has been present—be stacked and composted with other refuse to be rotted down for manure. Any plants showing signs of disease should be burnt.

ORCHARD NOTES FOR MAY.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

With the exception found in a few very late localities the harvesting of all deciduous fruits will be about completed in April.

The falling of the leaves is the signal for sharpening the pruning tools once more.

A separate article on pruning will appear in this and succeeding numbers of the *Journal of Agriculture*. I shall not deal with the subject here.

The cultivation of the orchard should begin with the first good soaking rain of winter. Most orchardists defer the first ploughing until the trees are pruned and the prunings cleaned away—that is, where the prunings are ever cleaned away.

This delay is unnecessary, and often in very wet localities it is the cause of putting off the work until the golden opportunity is missed, the ground sodden and unworkable until springtime comes again.

The deficiency in the rainfall during each of the last three or four years should certainly have set our fruitgrowers thinking how they could make the best use of the rain. Everyone cannot make dams or tanks to conserve it, but the conservation of moisture in the soil is within the reach of every grower.

When the fruit harvest is finished the soil around the trees is usually stamped down to a firm, smooth surface, off which the rain runs as from the macadamised road.

In this condition it is generally left until the spring arrives, when the rainy season has nearly departed. The orchardist then ploughs or digs in the weeds, and a short time afterwards he may pass the cultivator over and make a surface beautiful to look upon.

This is pretty work, but the rain which should have soaked for a good many feet into the subsoil all over the orchard has run off the smooth surface into the roadside ditches, and from thence to the creeks or rivers; or may be has run

into a lower portion of the plantation and probably drowned some trees, drawing forth the comment "that patch is too wet for fruit trees," and probably the other portion from which it came is stigmatised as "too dry." There is not the least doubt that this subject will sooner or later arouse an interest in the minds of our orchardists, and they will then wonder why such a simple matter was not attended to before.

I wish to urge upon every fruitgrower the need for early deep rough ploughing. Do it in such a manner that the winter's rain cannot beat it down. Remember that the air and rain passing into this soil deeply will dissolve out and render available to the roots the plant food so badly needed to nourish the trees.

Remember, further, that when the water runs off the surface of your ground it carries away, in a dissolved and undissolved condition, various enriching ingredients, and these all go to make that rank growth of weeds and rubbish on the banks of creeks and along watercourses at the roadsides.

The time for planting deciduous trees has arrived. All intending planters should consider well the preparation of the soil and subsoil before planting young trees. Unless the subsoil is naturally such as to permit the free passage of water through it, artificial drains should be constructed.

Many of our soils are underlaid by beds of stiff red clay. These require artificial drainage. Drains may be made of timber, stones, or clay pipes. The two former are usually plentiful in our fruit-growing areas, and cost little beyond the handling.

If the soil to be planted be virgin scrub or forest land, it should be either left in a broken rough condition for a summer, or if this cannot be afforded, a crop of hay or vegetables could be taken off to mellow the rankness of the surface soil, prior to setting out the trees.

Late autumn planting — while there is still warmth in the ground — is preferable to winter setting of deciduous trees. If set out in May the roots soon begin to grow, even though no leaves are pushed out on the top. These started roots assume activity more readily when spring arrives, and before the sun has gained sufficient power to cause rapid transpiration from the young leaves they are in active work in the new ground, and give the young tree a good strong start. Let me ask intending planters to put these statements to the practical test.

A special item on planting and varieties is reprinted on another page.

The ties upon budded stocks should be examined at intervals, and loosened or removed entirely, just according to the union which has taken place between the bud and stock.

If the union seems complete all around the inserted shield, the tie may be taken off, but if the edges of the shield are curling away, greater care should be exercised.

One of our leading fruit tree nurserymen has recently informed me of the damage done by the *Curculio* beetles in the direction of eating out the buds on citrus stocks just as they start into growth. Consequently he allows the loosened cotton wick ties to remain on as a protection to the young buds.

Stones of peach and apricot should be set out without delay to ensure a good even germination.

The present is a good time to apply slowly dissolving manure, such as bone-dust, to orchard trees. About 6lbs. per tree, of mature growth and in good bearing, will be a fair dressing. It may be turned in with the first ploughing, and should be sown in such a manner to cause its distribution pretty well over the whole area, and not immediately around the trees. This latter practice only applies to small trees.

Sprayings of resin wash can be applied for the destruction of Red Scale on citrus trees, with good results yet, even in the direction of killing the scales

upon the fruits. The caterpillars of codlin moth are now resuming their winter quarters, and a final and careful examination of the bandages should be made towards the end of May to catch stragglers. The bands should then be disinfected, and, if still strong, dried ready for use next season. During the wet weather the trees in infested orchards should be scraped cleanly, and the scrapings caught and burnt.

ORCHARD MANURING.

Abstracted and condensed from handbook on "Fertilisers," by Prof. Voorhees, Director of the New Jersey Experiment Stations, U.S.A.

In an article on Manuring of Orchards Prof. Voorhees states that for orchard work the fertilisers applied should be such as to provide for a gradual and continuous feeding of the trees. The forms which decay relatively slowly are as good, if not better, for many fruits than those immediately available. The former, however, should in most cases be supplemented by the quicker acting fertilisers. Fertilisers which have been found to be very serviceable for fruit crops have been made according to the following formulas:—(1) 1 part each of ground bone (bonedust), acid phosphate (mineral super.), and muriate of potash; or (2) $1\frac{1}{2}$ parts of ground bone to one part muriate of potash. Different quantities per acre should be applied to different classes of fruit according to the nature of the soil. The chief point to note is that an excess of nitrogen must be avoided, and if applied in an active form it must be done early in the season, the danger from an excess of nitrogen being that it causes too rapid growth of wood, and fruit which do not ripen well. The fertilisers should be distributed as far as possible throughout the lower layers of the soil where the feeding roots are located. If applied wholly to the surface, the feeding roots have a tendency to go to that point, consequently the trees suffer more from the effect of drought. Fertilisers should therefore be applied before ploughing, so as to work them well into the soil.

APPLES AND PEARS.—The fertilisation of apples and pears should begin as soon as the trees begin to bear, about $3\frac{1}{2}$ cwts. per acre of either of these basic mixtures being applied annually. As the trees get older and the crops heavier the application should be increased up to 8 cwts. to 10 cwts. per annum. On soils of only medium character fertilisation should begin earlier, and the applications made heavier. Experiments conducted at the Cornell Experiment Station showed that over a period of twenty years the apple crop, averaging 525 bush. per acre per annum, together with the usual foliage of the trees, removed from the soil twice as much nitrogen, one and a half times as much phosphoric acid, and nearly three times as much potash as twenty successive crops of wheat averaging 15 bush. per acre. Statistics collected in the state of New Jersey showed that over 90 per cent. of the commercial apple-growers in the central and southern districts, and 70 per cent. in the northern, use manures in their orchards, and all claim that it is a paying practice. On poor soils where nitrogen is lacking, as shown by the lack of vigor and color of the foliage in the spring, 1 cwt. to $1\frac{1}{2}$ cwt. of nitrate of soda might be given in addition to the fertilisers previously mentioned.

PEACHES.—These trees come into bearing earlier, and are more exhaustive than apples and pears, hence the demands for added plant food are greater earlier in their growth. Nitrogen in more readily available form is recommended for this variety of fruit. On medium and poor soils a dressing of 3 cwts. to 4 cwts. per acre of No. 1 or No. 2 may be necessary before planting, followed by the application of more readily soluble manures as the trees begin to bear. The need of nitrogen is often marked, and is shown by lack of vigor. On such soils, in addition to the basic formula, 100 lbs. to 150 lbs. of nitrate of

PEACH CURL-LEAF.

At the thirty-second annual Convention of the Ohio State Horticultural Society held in December, 1898, Mr. W. Miller gave the following particulars *re* his experience in the treatment of peach curl-leaf (*Exoascus deformans*):—

In the writer's orchard, in 1896, Professor Selby, of the Ohio Experimental Station, began a series of experiments to prevent, if possible, the damage resulting from the leaf curl fungus. But little appeared that year, and not apparent good resulted. In 1897 most satisfactory results were obtained, but owing to the total failure of the crop that year the benefits derived did not impress themselves upon the average grower. But the question has been settled, so far as the station was concerned, that spraying at the proper time with Bordeaux mixture would prevent damage resulting from the presence of this fungus. This year the writer continued the work under the advice and direction of Professor Selby, spraying his Elberta trees, first before the buds began to swell, next just before the blossoms opened, and again after the blossoms had fallen. It was found that the first spraying only was necessary. Where the work was thoroughly done at that time—though the curl was not entirely prevented—enough foliage was held to prevent the dropping of the fruit. The unsprayed trees and those sprayed only the second and third time lost a large portion of both foliage and fruit. Hereafter it will be the aim to spray but once, thoroughly, before the buds start, with full strength Bordeaux mixture, confident that no curl injury will follow.

The commercial value of the work can best be illustrated by giving a table prepared by Mr. J. C. Britton, who assisted in harvesting the fruit. The fruit produced on a block of 165 trees, on which the first spraying was omitted, is compared with that produced on 119 sprayed trees adjoining:—

Number of bushels produced on 165 unsprayed trees..	11
Number of bushels produced on 119 sprayed trees.....	143
Number of bushels per tree on unsprayed trees	·07
Number of bushels per tree on sprayed trees	1·21
Number of bushels per tree gained by spraying	1·14
Number of bushels lost by not spraying 165 trees	186·45
Average price per bushel	6s. 3d.
Money lost by not spraying the 165 trees	£58 5s. 4d.

We no longer ask, "Can we afford to spray?" but rather, "Can we afford not to spray?"

FRUIT TREE PRUNING.—No. 2.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

Although we have not proceeded far with our study, we are able to discern that a series of problems are bound up in the pruning of each individual tree.

Were it not possible to lay down some general principles by which the pruner may be guided in his operations, his practices would have an extremely varying and uncertain value.

The immediate objects sought by the pruner at this stage in the treatment of the young tree are *the modification of the natural form* and *the promotion of wood growth*.

To attain this end without disappointment and delay he must first master the general principles underlying the work. I desire at this juncture to express my indebtedness to Professor Perkins' lucid translations from standard French authors in enabling me to state these propositions clearly.

Firstly the pruner must know that *the vigor of a plant or of a shoot from a plant is in direct proportion with the leaf surface upon it.* It is necessary to bear this in mind at all times to check any tendency to excessive pruning, more especially during the season of active vegetation.

Secondly—*The nearer a shoot approaches a vertical position the stronger will be its growth.* This has an important bearing upon the selection of buds to continue the main shoots of the tree.

Thirdly—*The lesser the number of buds left upon a branch the stronger will be the growth made by each individual shoot arising from those buds.* It is for this reason we reduce the main shoots (Plate VII.) to a few buds, to obtain strong growths to be used as main arms.

Fourthly.—*Upon healthy shoots possessing a number of buds, usually the uppermost ones absorb the greatest volume of sap and make the most vigorous growth.* We have this illustrated in those shoots out of which it is frequently necessary to pinch the growing points, to prevent them unduly robbing less favorably-located shoots.

The three young trees shown on Plate VII. have been pruned, with the object of obtaining a type or shape previously referred to as a "goblet vase." This tree consists of a single short stout stem, varying from 1ft. to 20in. in height, from which, at distances of about 4in., and at even angles from the stem will spring a number of primary main arms or branches. From these primary arms a growth of secondary main limbs will be encouraged, in the proportion of two from each. Upon these, again, the final number of main shoots will be developed in about the same proportionate numbers.

Upon these last-named main shoots, and sometimes upon their predecessors, fruit-bearing laterals or spurs should be encouraged. The tree—as the name implies—will be hollow in the centre; that is, no main arms will be permitted to develop in that position.

The lateral growths from the sub-main arms will be allowed to spread into the centre to a certain extent—as far as is required to shade the bark of the main and sub-main branches from the direct rays of the sun.

This type may be considered an arbitrary ideal, and be condemned by some persons as leaning too largely toward the class of tree affected by the amateur or the enthusiast, who does not view its results commercially.

The advantages possessed by this type are so self evident under the comparatively even conditions ruling in South Australian orchard districts, that the nearer it can be approached at a payable cost the better will be the attendant results. I freely admit the improbability that all trees can be trained as geometrically correct as our drawings imply, but the nearer they approach each other in this respect the more will such operations as pruning and cultivation be facilitated, as less time will be required to study the distribution of fruit-bearing wood, &c., over each individual tree. In other words the subsequent prunings will be reduced more toward a mechanical effort.

Evenness of cropping and ripening are also more likely to accrue and fruit of a more uniform quality be borne.

At this early period in the shaping of our future tree I wish to reconcile our hard pruning with the physiological fact set forth in the first general principle, as at a superficial glance they may appear inconsistent.

We are about to form a strong tree, carrying only a few stout arms, and to do this we have trimmed it back to a few shoots, upon each of which only a very limited number of buds are retained.

The teachings of vegetable physiology show that the leaves—green parts—of a plant are equivalent to the stomach as well as the lungs of an animal, and therefore the proposition set out in our first principle.

We have reduced enormously the number of shoots upon the young trees

under review, and thereby prevented their respective buds throwing out leaves, consequently it may appear that the plants are deprived of their means of development, and instead of being strengthened in certain directions, would be weakened generally to such an extent as to render that assumption untenable.

If we glance at Plate III. in our former article we will notice in Fig. 1 twenty-two buds have started into growth during last summer, and produced a combined length of 19ft. 6in. of branches—as measured prior to being photographed.

The tree represented by Fig. 2 sent out thirty-four shoots aggregating 24ft. 9in. of growth.

It will thus be seen that the lesser number on Fig. 1 averaged a greater length, and certainly produced stouter primary shoots.

The pruning shown in Plate VII. will concentrate the energies of the tree into fewer channels still, and thus render those individually stouter. The leaf surface need not necessarily be lessened, excepting in the early break of spring,

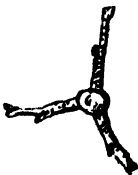


FIG. 1.



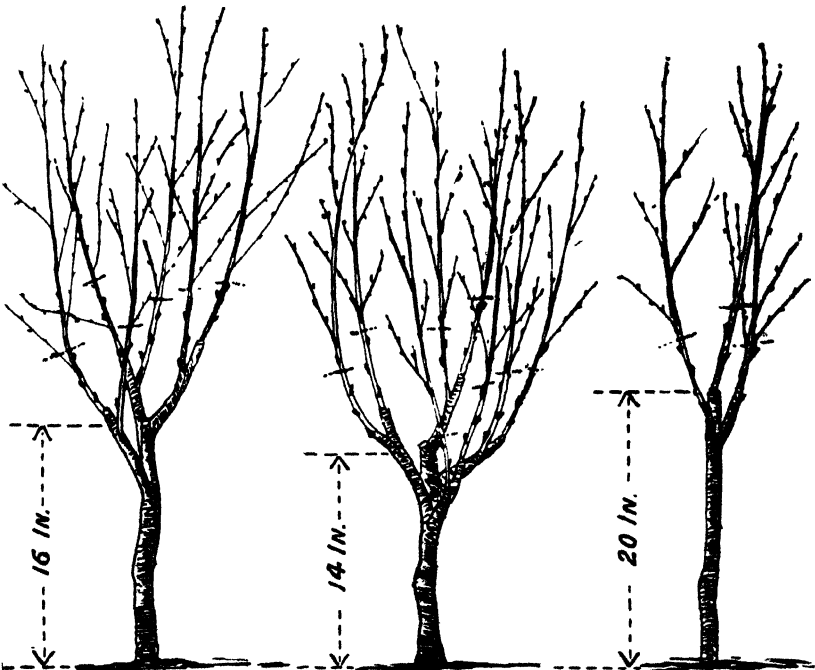
FIG. 2.



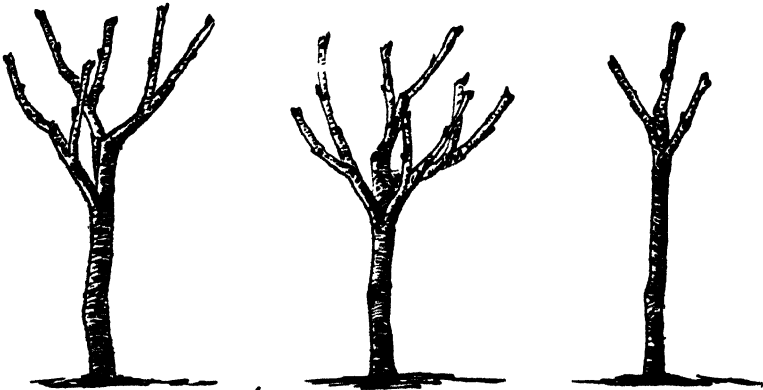
FIG. 3.

PLATE VII.—THE TREES WITH BRANCHES AND ROOTS PRUNED,
WITH ENLARGED GROUND PLAN OF TREES.

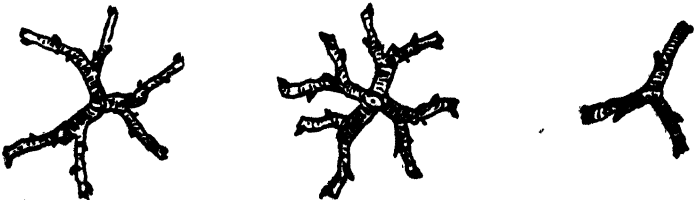
as stronger shoots will send out many more and larger leaves than weak shoots, and the average aggregate length of growths made in one season upon young pruned trees have been found to surpass those of similar trees left unpruned. Thus it will be seen that the propositions contained in our first and third principles are not so much at variance as they may at first appear.



GROWTH MADE FIRST YEAR AFTER PLANTING.



SECOND WINTER PRUNING.



GROUND PLAN FOR SECOND WINTER PRUNING.

Returning to Plate VII., it will be readily seen on the ground plan attached, which shows the trees as they appear from above, that on Figs. 1 and 2 the shoots retained upon the main stem have been shortened back so that each one only possesses two or three healthy buds. When growth begins in the following spring these will be encouraged to grow as strongly as possible.

Those buds should be selected which are located on the sides of these shoots, as this equalises their chances of growth, as well as being more conducive to the correct formation of the plan of the tree. Terminal buds located on the upper side of a shoot almost invariably absorb more sap, and grow stronger than those that are placed beneath or on the sides (vide second principle). The two shoots near the end should be encouraged to grow as much as possible, and should any others start to grow they must be pinched back from time to time during the growing season. This pinching should be regulated by their respective growths. If a lateral shoot shows a tendency to grow strongly, and in any manner endanger the claims of the selected leading shoots, it should have its growing point pinched out frequently as it attempts to make headway. This practice should be extended to the leading shoots as well, under certain conditions. It will happen on every tree, and almost on every main limb, that one leading shoot—generally the upper one—will try to grow away from the others. This stronger one should be temporarily checked by having its young growing point pinched out. This may be repeated several times in the growing season, and by the time the next winter pruning is done the two shoots can usually be operated upon equally.

In a later article on summer pruning I propose giving photographs taken from young trees which have been thus treated successfully. It is sometimes advocated that all growths arising at this juncture (excepting those main shoots desired for the formation of the tree) should be removed as soon as they appear. This is scarcely to be recommended, owing to the need for again clothing the tree in leafage as soon as possible. Sheltering the bark from the fierce rays of the midsummer sun is necessary, but more important is it that there should quickly be abundance of foliage to assist in the vegetative functions of the tree.

When the time for the second winter pruning arrives these trees should present somewhat the appearance of the upper illustrations in Plate VIII.

A few more short pinched spurs may be showing upon the lower arms and stems. Unless the trees have displayed exceptional vigor these had better be pruned away completely from the stems. The dotted lines show where the main shoots will be pruned, and the figures immediately below illustrate the trees when pruned. It will be noticed that from three to six buds are left on each secondary main arm. The topmost of these are chosen, which indicates that their future growths will maintain the good circular shape of the plan of the tree, for at this period any irregularity in the direction taken by either of the main arms may be corrected by encouraging buds whose future growth may be calculated to fill up the wider spaces or gaps.

When pruning in winter it will invariably be found that a certain unevenness of growth has taken place among the secondary main arms. Some will be stronger than others, but such discrepancies will be slight if the attentions mentioned above have been carefully rendered during the growing period of the previous summer. These weaker shoots should be reduced to a lesser number of buds than their stronger fellows, and then in the next growing season the shoots from the stronger arms should receive very careful attention in the direction of pinching out their terminal growing points, for the purpose of checking them to the gain of the growths from the weaker arms.

All things being equal the growths made during the summer following the second winter pruning should be much stronger comparatively than those of the previous season.

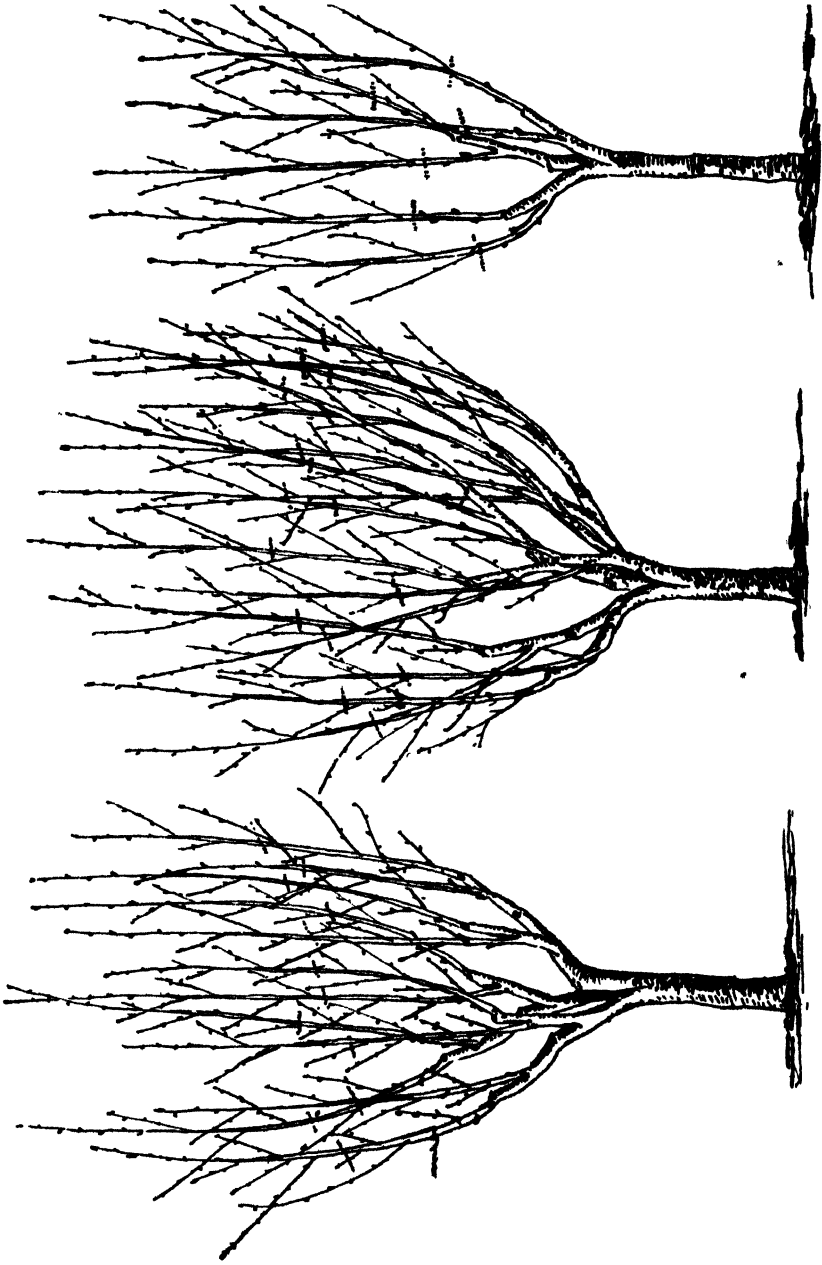


PLATE IX.—SHOWING GROWTH AFTER SECOND WINTER PRUNING.

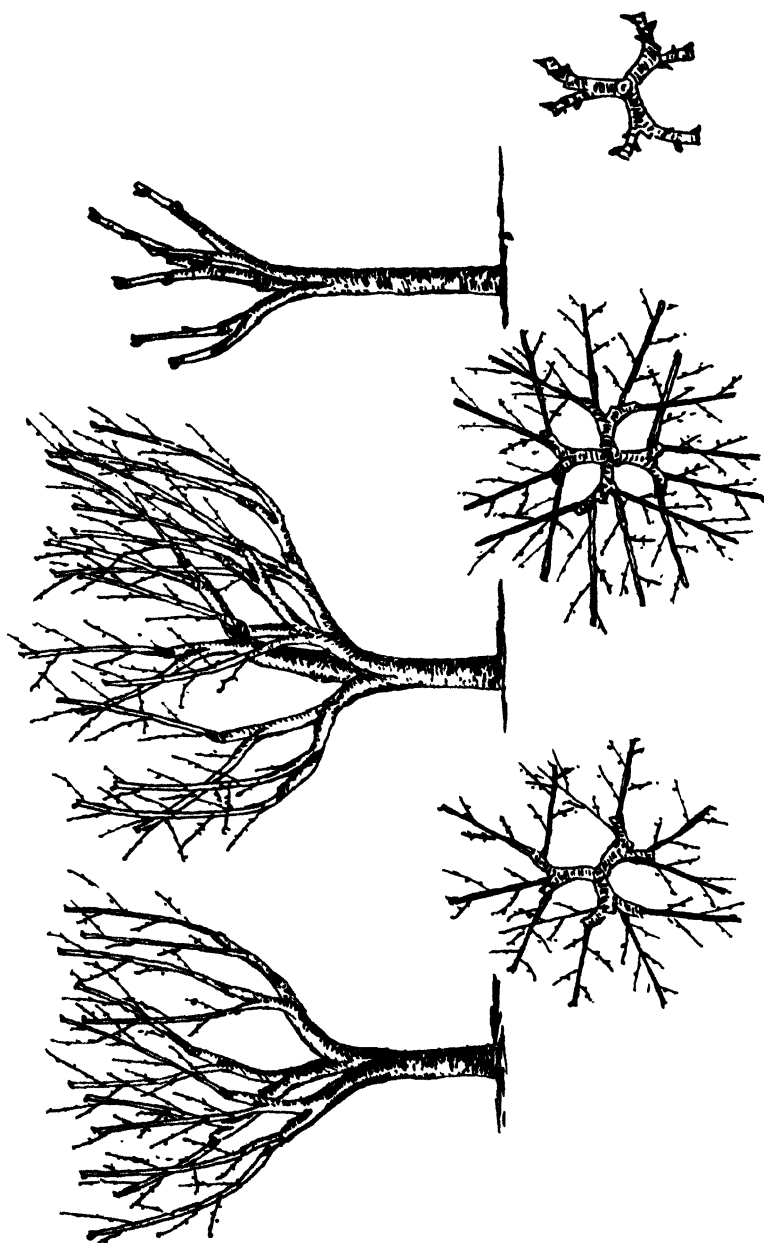


PLATE X.—THIRD WINTER PRUNING. AND GROUND PLAN OR SAME

The root system has now regained its normal condition, and the reduction in the top made by this pruning will be repaired very rapidly by the tree, and thus a balance between roots and branches be obtained once more.

The growths from the secondary main arms—made after the second winter pruning—will be treated in a manner similar to that laid down for the previous year, excepting that laterals upon them will be treated with regard for their future welfare as fruit producers.

Plate IX. conveys a fair idea of the condition of these trees when the time has arrived for the third winter pruning. The dotted lines indicate the points at which the leading shoots would be severed. These shoots would be allowed a length of from 12in. to 24in., according to the kind of tree under treatment. The lateral shoots would be cut to a length which would also be governed by the same consideration.

Plate X. shows these trees pruned, and the ground plan of the tree when pruned. We have now before us a tree with a short stout stem, from which radiate main arms, and from these secondary main arms, and from these again, leading shoots, all built upon strong principles.

Each recurring year will add fresh layers of wood to increase their strength, and enable them to carry the increasing burdens that fruit and foliage may impose.

Every growth upon them has a useful mission, and all are directed towards the final object sought, viz., the securing of a tree which will produce the greatest quantity of superior fruit at a minimum cost.

With but few modifications this type is applicable to the peach, apple, apricot, nectarine, quince, plum, pear, cherry, and almond.

The pyramidal form is, no doubt, the natural shape for the pear, but it is yet an unsettled question whether, under the costly conditions of labor in South Australia, the grower could train them to that ideal shape at a profit.

(To be continued.)

THE SELECTION AND PLANTING OF FRUIT TREES.

COMPILED BY GEORGE QUINN, INSPECTOR OF FRUIT.

Land intended for planting should be thoroughly prepared some time beforehand, and if it be virgin scrub or forest land a crop of cereals or vegetables should be taken off before planting fruit trees.

Heavy clay soils are not the most suitable for fruit trees, but should such be used provision must be made for under drainage. In all cases the land should be broken up thoroughly, keeping the subsoil in its natural position. In large plantations this is best done by a strong subsoil plough following in the ordinary turning plough's furrow, thus breaking the soil to about 18in. or 20in. deep. Soils that are saturated and boggy in winter in spite of draining should not be planted. Frosts are usually more severe and late in low-lying flats; consequently these should be avoided as far as practicable, and gentle undulations or hillside slopes be chosen.

Peach, apricot, cherry, and all the citrus fruits do not thrive in cold saturated soils, but require well-drained situations. Plums will put up with more moisture in the soil than any other fruits. Pears and quinces may be said to come next, while apples producing fruits of a long-keeping character should not be grown in very damp situations.

In nearly every locality a windbreak is necessary, and if it be at all possible a good belt of trees—not a couple of rows—should be planted; or if natural

timber be present, a strip, say of two or three chains wide, should be retained on the sides exposed to cold, cutting, or hot, withering winds. In many places the soil is limited, and paling or galvanized-iron fences may be put up, close to which, on the inside, rows of almonds or loquats should be planted, as they will pay for the space they occupy and give shelter as well. Barrels or sugar baskets are not good protectors, as they tend to "draw" the growths up in a weakly condition.

The ultimate dimensions of the trees should be considered in connection with the soil and other conditions when planting, as in rich soils the trees will grow strongly and spread over a much wider area than in those of a poor quality. For the convenience of working the trees should be planted on the "square" principle. They are then equidistant from each other, and a free passage of light and air is assured.

About 20ft. apart can be taken as a suitable distance to plant apples, pears, plums, cherries, peaches, apricots, oranges, and lemons on the average soils of South Australia, but in richer soils greater spaces are necessary unless the trees are sharply pruned. At 20ft apart about 108 trees can be set out on an acre; 24ft., seventy-five trees; and at 30ft., forty-eight trees. In small home gardens, where space is limited, trees may be set at 16ft., or even less, but they require sharp pruning to keep them within bounds.

The season for the autumn planting of citrus trees is too far advanced now, and it is therefore advisable to stay operations until the early spring. Deciduous trees should be got in without delay. They should be purchased from a reliable nurseryman who has a reputation and trade to lose if he defrauds the purchaser in respect to the accuracy of names, stocks, used, &c. In selecting the various trees, see that the plums are worked on myrobalan stocks, not on common plum seedlings or suckers. Pears should be on pear seedling stocks, and apples should be double worked or worked on growths from blight-proof roots *not less than 6in. above the surface of the ground*. The reason for this is that trees worked lower are apt, if covered by soil or mulch as high as the union, to send out adventitious roots and thus discard the original blight-proof roots. The apricot is best on apricot roots, and peach upon peach, but at the same time, in very dry soils, apricots may be put on almonds, and peaches upon plum for very wet cold localities, but neither can be claimed as a commercial success.

Every precaution against the introduction of pests should be taken, and if the trees on arrival at the orchard could be completely submerged in a strong solution of tobacco and soap mixture for about fifteen minutes much vermin would be avoided. Citrus trees could be treated with strong resin wash to destroy scale insects.

In selecting trees, do not be misled by their sizes, as a medium sized, stout, clean barked tree is always more satisfactory than a skyscraper. A tree composed of one straight clean stem is desirable, as then the grower can cut the stems to a suitable length and form the trunk in keeping with requirements. About "knee high" is a good useful length to sever the stem to frame a sturdy weight-resisting tree. This will avoid the formation of weakly forks, as the arm junctions swell with growth. The roots of the young trees should receive attention. If the trees have been out of the soil for a few hours pretty well all the fibrous roots will perish; consequently under such conditions they should be thinned out carefully. All broken roots should be cleanly severed above the bruise and the cut should be made *beneath* or *on the under side* of the root.

It is sometimes necessary to put a stake to support young newly-planted trees, but this is not absolutely needful, and may be dispensed with in nicely-sheltered positions. If stakes are used, care should be taken to avoid mutilating the roots

when driving them down. They should be on ~~the~~ side of the prevailing wind. On the whole, it may be fairly inferred ~~that~~ only a small proportion of the short-trunked sturdy trees of more recent plantings will require staking.

There are other considerations, such as suitable fencing, to keep out ground vermin, which must be properly attended to if the trees are to be a success.

The following is a list of some of the most suitable trees for planting for commercial purposes. Do not plant a large number of varieties, but confine your attention to a few of the best of each class. Take into consideration any advantages of closeness to markets or proved capabilities of the locality for producing the finest early, medium, or late fruits, and go straight for that particular object. A large collection may, during occasional years, yield the best return, but the grower who finds what he can grow thoroughly well in his particular locality, and specialises on that, will come out top during a run of seasons:—

APPLES.

EARLY (for Local Markets only).—*Dessert*: Mr. Gladstone, Early Margaret, Irish Peach, Devonshire Quarrenden, Ribston Pippin. *Kitchen*: Mobb's Royal, Lord Nelson, Lord Suffield.

LATE (for Export and Keeping).—Cleopatra, Jonathan, London Pippin, Northern Spy, Rome Beauty, Strawberry Pippin, Dunn's Seedling, Stone Pippin, Buncombe.

Should the intending planter be aware that some of the above will not thrive under his peculiar conditions from the following supplementary list others could be selected of good quality:—Dumelow's Seedling, Cox's Orange Pippin, Adams' Pearmain, Esopus Spitzenberg, Calville Blanche, Cornish Aromatic, New Town Pippin, Pomme de Nieve, Shockley, Scarlet Nonpareil, Winter (or Scarlet) Pearmain.

This may appear a formidable list, and a contradiction to the above advice *re* selecting only a few, but it must be distinctly understood that probably in no locality in this colony can more than a dozen of the sorts named herein be brought to the highest state of excellence.

PEARS.

EARLY (for Local Markets only).—Citron des Carmes, Jargonelle, Doyenne D'Ete, Williams' Bon Chretien (known here as Duchess).

MID-SEASON (Local Market).—Poire du Berriays, Beurre Capiaumont, Beurre Diel, Durondeau, Flemish Beauty, Gansell's Bergamot, Marie Louise (shy bearer), Doyenne du Comice.

WINTER (Keeping or Export).—Glou Morceau (known here as late Duchess), L'Inconnue, Josephine de Malines, Madame Cole, Vicar of Winkfield (known also here as Napoleon), Winter Nelis (shy bearer), Uvedale's St. Germain, Swan Egg, Catillac.

APRICOTS.

EARLY.—Oullin's Early Peach (improved), Newcastle Early, Red Masculine, Shipley's Blenheim.

MEDIUM AND LATE.—Moorpark, Hemskirke, Royal, Campbellfield Seedling.

CHERRIES.

Early Purple Guigne, Early Twyford, Biggareau Napoleon, Waterloo, St. Margarets.

NECTARINES.

EARLY.—Hunt's Tawny, Elruge, Irrewarra.

MEDIUM.—Shortland's Tawny, Balgowan.

LATE.—Victoria, Stanwick,

PEACHES.

EARLY MARKET.—*Dessert*: Brigg's Red May, Amsden's June, Alexander's Early, Early Rivers, Early Silver, Hale's Early, Beatrice.

MID-SEASON.—*Dessert*: Royal George, Early Crawford, Noblesse.

AFTER MID-SEASON (*Dessert, Drying or Canning*).—Sea Eagle, Comet, Salway, Lady Palmerston, Muir, Foster, Elberta, Orange Cling (Nicol's), Lemon Cling.

PLUMS.

EARLY (for Local Markets).—Rivers' Early Prolific, Early New Orleans, Green Gage, Angelina Burdett.

MID-SEASON (*Dessert and Preserving*).—Kirk's, Reine Victoria, Prince Englebert, Washington.

LATE (*Drying, Dessert, or Preserving*).—Ickworth Imperatrice, Coe's Golden Drop, Fellenberg, Egg Plum (yellow), French Prune, Pond's Seedling, Jeffersons, Belle de Septembre, Coe's Late Red, Reine Claude de Baviay.

Of the comparatively new Japanese Plums, Simoni, Kelsey, Satsuma, General Saigo, Bohtan, Golden Heart, have all been found to bear freely and their fruits dry fairly well.

THE VINEYARD.

SEASONABLE NOTES.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

From the vinegrower's point of view April has been seasonable enough; dry fine weather favored the gathering in of the second crop, and with it yet another season has been buried with the irrevocable past. After all, at best, it is but a dead sort of month, lying betwixt the old and the new, and bringing to the vinegrower slumbers that no thought of fickle weather need disturb. But with the coming of May 'tis another story. Throwing off April torpor and bent on retrieving the errors and misfortunes of the past, we must enter anew into active life. Alas, for the last five or six years I have harped on the same theme, with about as much success as befell those scriptural heroes, the sparrow on the housetop and the pelican in the wilderness. I must despondently admit that most of our old growers still obstinately cling to the opinion that balmy September weather alone need bring to a close their lengthy hibernation. True, in the interval the vines are pruned, but, under the circumstances, this solitary sign of vital activity, may it not be traced to reflex or somnambulistic influences? In spite of the unfortunate results of the past few years, thoughts of the time that is being wasted and the necessity of early and deep cultivation does not appear to disturb their dreams. And yet without exaggeration may it be said that, in a dry country such as ours, this practice offers the main secret underlying successful vine-growing. In support of such a statement let me quote some conclusions from my departmental report for 1896-7:—

"In average seasons about four-fifths of the yearly supply of rain falls during the seven winter and spring months (April to October inclusive).

"In average seasons about three-fifths of the winter and spring rains fall between the 1st of April and the 31st of July, representing half the yearly fall.

"In average seasons only about two-fifths of the winter and spring rains fall from the 1st of August to the 31st October, representing about three-tenths of the yearly fall."

These conclusions were derived from a careful examination of the meteorological records of our principal vine-growing districts, and if they do not cry out aloud in favor of early cultivation I must give up attempting to interpret

phenomena that directly affect agricultural matters. To my mind in a dry country the principles of cultivation may be summed up as follows :—Store up moisture in the soil in winter, preserve it there in summer. The importance of the other objects of tillage I fully recognise, but as by keeping the above principles in view they will always be fully satisfied, they may be neglected for the present. The winter working should be given on a deep furrow from 6in. to 8in., loosening the soil and giving free access to the winter rains. Neither harrows nor cultivators should be used at this time of the year; the rougher and more irregular the surface the less is the soil able to set down into a hard pan and the better are the rains able to penetrate into the subsoil. Strike out the first furrow in the centre of the rows, heaping the soil up and leaving deep finishing furrows alongside of the vines. This practice presents the additional advantage of destroying any surface roots that may have been formed and of indirectly strengthening the deep root system. Such, then, independently of any consideration of weeds or of any other secondary factor, is the winter tillage that should be applied to dry country vineyards. But of what benefit can it possibly be unless it is undertaken early in winter so as to enable the subsoil to get the full benefit of all the rain that may fall? Of what possible advantage can it be if the first furrow is struck towards the end of August after the fall of the greater part of the annual rainfall?

Having in view the tillage of the soil, I have referred to May as being the month in which the campaign shall be opened. I am perfectly aware, however, that in matters of this sort circumstances cannot be bound by absolute rules. To start deep cultivation before a fairly heavy fall of rain is evidently out of the question. Such a fall, however, may generally be depended upon some time during the course of May. Its arrival should be taken as the signal for putting the ploughs in hand; should it prove unusually tardy the initiation may have to be postponed until the following month. It may be argued with some appearance of justice that a vineyard cannot be conveniently ploughed before the superfluous wood has been removed by the pruner. For closely-planted bush vines this is certainly true; not so for trellises and bush vines planted 9ft. to 10ft. apart. A considerable portion of the soil lying between the rows may be worked, leaving narrow strips to be completed after the pruning. In any case during the course of this month this latter operation should be carried on with vigor so as to make room for the ploughs at the earliest opportunity. It is better to prune a bit too early than to plough a bit too late.

Incidental reference to other objects of winter tillage has been made above; a few lines devoted to their elucidation may not prove inopportune. It has been stated that in dry countries considerations having reference to the storage and preservation of moisture in the soil should primarily govern all tillage operations; this fact, however, does not for a moment imply that its other important influences on plant life should be lost sight of by the intelligent cultivator. Of themselves the roots of vines seek the shelter of the deeper layers of the subsoil; cultural operations to a great extent encourage them in this their native faculty. Every living portion of plants, and more particularly their active growing extremities, require for their well-being a copious supply of free oxygen; all spring and summer operations, whether of tillage or otherwise, tend to tramp down and consolidate the soil, confining its atmosphere and accumulating the proportion of carbonic acid gas evolved in the respiration of the roots. Again, from the point of view of successful plant growth, not to the roots alone is the free access of air indispensable. In the soil plants have an almost inexhaustible storehouse of foodstuffs that slowly and to a great extent in proportion to their natural wants become available to them. Cultivation, however, by forcing from a given area an abnormally large bulk of plant growth, breaks up nature's well-regulated system. The amount liberated by natural

means as available plant food becomes insufficient, and the soil rapidly shows signs of apparent exhaustion. To a great extent this sickness of the land may be combated by a liberal use of artificial manures ; this latter method, however, that was dealt with at considerable length in last month's issue, need not be touched upon again ; here I wish merely to draw attention to the manner in which tillage intelligently applied tends to renovate and restore to their pristine fertility weary worn soils. To a very great extent this imprisoned plant food only becomes liberated under the oxidising influence of the air and the disintegrating action of the dissolved organic acids that tillage distributes evenly through the soil. Further, deep tillage brings nearer the surface particles that would otherwise escape the influence of these useful agents of man. And, finally, much of this decomposition of otherwise useless matter is due to the active work of micro-organisms that live in the surface soil ; of such is the nitrification of organic matter. Be it noted that such organisms thrive only in an open and well-aerated soil ; in compact waterlogged soils their action is reduced to *nil*. From all such considerations it may be gathered that if deep early winter cultivation may be said to be as necessary to the water supply of plants as the clearing of drains is to the proper catchment of dams, so at the same time it is of immense importance in placing the plants in a healthy state of development and yielding them the maximum amount of available foodstuffs. Winter ploughing must be deep, thorough, and early : a true work of aeration.



In many localities pruning operations may be started during the course of this month. In large vineyards, where there is always much ploughing to be done, it will not always be necessary to wait for the fall of the leaves. Over smaller areas the work may be postponed without any serious inconvenience. A word of warning in regard to the general treatment of vines during the course of this year may not be out of place. Let not the fact that the vines have of late years been severely tried, both by drought and hail, escape the memory of the pruner. On no account should the plants be made to bear an over-abundance of wood during the incoming season, more especially where the growth is perceptibly weak. In many cases vines that are normally rod-pruned should only be spur-pruned this winter ; in fact, have more in view the crops of future seasons than that of one immediately before us.

During the past month the Phylloxera Bill was brought to the fore again at a meeting held at Tanunda, and convened by supporters of the Bill, for the purpose of trying to come to an understanding with its opponents. The gathering was rather small, and came to no very important decision on the matter. A resolution was, however, carried in favor of the principle of the Bill, which was to be redrafted under the supervision of authorised delegates from our principal vine districts. In our March issue (page 635), whilst agreeing that the Bill introduced before the Assembly was possibly susceptible of improvement, I expressed my inability to understand the objections of the opponents of the principle of the Bill. Since then I have been favored with a letter from a leading Angaston grower, in which these objections are given a tangible form. As will be seen in the sequel, they can easily be refuted ; but, lest I should unintentionally do injustice to the writer, I will first quote the objections in his own terms :—

“Firstly, judging from the experience in Victoria and New South Wales, any scheme of compensation to growers seems to be useless. Mr. D. Tolley, who is one of the ardent supporters of the measure, is my authority for stating

that in the former colony £50,000 had been spent, and quite lately it appears that both there and in New South Wales they have given up the idea of stamping out the pest, and intend in the future to depend on American resistant vines. If that is the result over there, in what way are we better located for dealing with the matter, provided the pest gets into our vineyards? And, of course, this I look upon as only a matter of time. I believe that the experience at the Cape has been the same, that the only way to cope with the phylloxera is to adopt the resistant stocks.

"Secondly, even if we admit that the pest could be successfully dealt with by a scheme of insurance, the one proposed is altogether inadequate. We have in round figures 18,000 acres under vines, which at the rate proposed would yield about £900 per annum. Out of this sum are to be met expenses of collection, office and incidental expenses, and salaries to carry the matter out; this would leave a very small balance for the compensation fund, which for bearing vineyards is to be £15 an acre.

"Of course the first is to me *the* reason why I do not think there is much chance of coping with the matter in the way proposed; the second is merely an objection to the Bill.

"There are also local objections being urged, but with these I do not agree; but they certainly influence the attitude of others Until it can be shown that the methods adopted elsewhere to cope with the phylloxera have been radically wrong, and that we can so improve on these methods here as to deal effectively with it, I shall still oppose the imposition of a rate and the scheme of compensation."

Such, then, are the objections of an important opponent of the Bill. At the very first glance it will be apparent that his first and main objection arises out of a misconception of the scope and object of the Bill. The insurance scheme to which he objects is not a scheme having for its object the extirpation of the phylloxera, but the compensation of those growers whose vineyards it will have been necessary to uproot in the interests of others. As matters stand past laws fully authorise and even direct the executive to take immediate steps towards the uprooting of affected vineyards at the expense of the owner. The present Bill merely seeks to remedy the evident injustice of past legislation. If by legislation vineyards are to be uprooted for the public good, it is only fair that those that profit by these drastic measures should compensate the unfortunate owners; hence the insurance fund, to which in common justice all vine-growers should contribute.

My correspondent further points to the recent action of Victoria, New South Wales, and the Cape as tending to prove that the pest cannot be stamped out. It does not appear to me on this account necessary that the methods of extinction always adopted in newly-invaded countries should be done away with. Unless invaded vineyards are uprooted in four or five years there would not be a sound vine in the colony. Is this a prospect that my correspondent is prepared to face? Given that the pest appeared suddenly in our midst, by stamping out the centres of infection and energetic measures we could easily keep in check for twenty to thirty years, as has been done in Switzerland, for instance, where vineyards almost touch one another. Victoria and New South Wales have been infested with the pest since 1875, and it is only recently that they have given up the struggle and taken to American vines. And I may say this much, that during a visit to both of these colonies I was by no means impressed by the energy with which they were dealing with the pest. But because after holding in check for over twenty years our neighbors decide to give up the struggle, are we to sit down and see our established vineyards destroyed because we can build up new ones on resistant stock? Is it such a small matter to create a new vineyard?

I think that my correspondent is also wrong in supposing that salaries would mop up all the money collected ; the services of the board are purely honorary, and would only involve a certain amount of travelling expenses ; and, further, the Commissioner of Taxes could practically collect the whole amount free of cost.

NEW HEALTH ACT.

BY C. J. VALENTINE, CHIEF INSPECTOR OF STOCK.

The attention of farmers, dairymen, butchers, and owners of stock generally, is directed to the provisions of the new Health Act. They should get the Act (it can be obtained at the Government Printing Office), and read the provisions relating to "food and milk supplies." Although dealing in several instances in respect to fat stock, meat, and the use of milk from diseased cows, as is provided under the Stock Diseases Act, it is more drastic, and requires much to be done that has been unprovided for hitherto in dealing with dairy cattle, their food, yards, and with swine, milk, and vessels used in connection with it.

Owners discovering any animals diseased must give written notice to the Local Board of Health, and isolate such animals, and it is no defence for the owner to say he did not know it. If the inspector finds a diseased animal, or is satisfied an animal is suffering from an infectious disease, *he shall* give notice to the owner to kill and *destroy* the carcass, no matter how slightly the animal may be affected, if it is only locally affected, say a small actinomycotic lump in the jaw, a small lobe of the lung slightly affected with tuberculosis, or a slight touch of pleuro-pneumonia. This is drastic treatment, but is required under the Act. The selling or exposing for sale any diseased animal, or meat therefrom, renders the person liable to a penalty, and any person having for sale any such animal, or meat in his possession or control, is deemed to be a person who exposes such meat or animal for sale.

The milk supply is carefully looked after. Any person supplying milk from a diseased animal, or milk from a cow suffering from ulcers or other diseases of the udder, to others is liable to a £20 penalty. Neither must he mix any such milk with other milk for human consumption, for sale for butter or cheese making, nor may he use such tainted milk, or give it to swine or other animals without boiling, of which due notice must be given to the Local Board.

Besides this, cowyards, sheds, dairies, milk stores, and vessels used for milk must be kept in a healthy sanitary condition—that is, what the inspector considers a sanitary condition.

Cows from which supplies are drawn must be kept in good condition and health, and fed upon healthy good food. No person who is suffering from any infectious disease must be allowed to milk cows, or assist in any part of the duties in connection with the dairy.

These are some of the provisions of the Health Act, but there are others which it is necessary for all persons who buy and sell meat, who keep dairies, or sell milk, to make themselves thoroughly acquainted with. It is much better to be up and doing, and not wait for the law to be enforced. Clear the herds of disease. There is great necessity for action being taken to get rid of tuberculosis. It is an expensive enemy to both farmer and dairyman. Have the herds tested with tuberculin. Get the Board of Health to supply it, and someone who is an expert to test cattle. It is not work that the farmer or dairyman can do himself so thoroughly and quickly as an expert. But they can watch their herds, get rid of old ill-doing beasts, have no suspicious looking animals, isolate doubtful cows—if not saleable have them boiled down. Much can be done, but study the Health Act, and learn what *must* be done.

STOCK REPORTS.

By C. J. VALENTINE, CHIEF INSPECTOR OF STOCK.

The reports of the Stock Inspectors for the quarter ending March 31 show the necessity for careful inspection of stock. The losses on farms from non-contagious diseases have been heavier than usual—the effect of the summer, when feed is dry, innutritious, and scarce.

Sheep generally are healthy and thriving. Internal parasites have not been prevalent to any extent, but a number of deaths have occurred from stomach staggers, and inflammation. Flocks which have been kept on dry short feed on being removed to richer pastures—stubbles and rich flats, on which there has been an unusual growth of succulent food—have died quickly. More care should be taken, and on sickness appearing the animals should be immediately removed to other pasture. Place them on the fresh pasture for short periods until they have become accustomed to the change. Stinkwort, as usual, is causing losses with lambing ewes, and they should be at once removed and a mild purgative given. In the North ticks have not been so prevalent, last year's dipping having in many instances cleaned the sheep. Notices have been received of over one million sheep having been dipped with much benefit to the sheep.

Ninety-seven cattle have been destroyed affected with tuberculosis, and a number isolated for further inspection. Of those destroyed a number were milch cows, from which owners were using the milk—several being bad cases of tubercle in the udder. In one instance, it is reported, a child which had been fed on the milk from a cow with a tubercular udder died from tabes mesenterica. Gross carelessness is exhibited by owners of diseased milch cows in milking and using the milk. Twenty-three cases of actinomycosis occurred, and the animals were destroyed; others slightly affected were left to be fattened and destroyed if necessary.

Eleven cattle were destroyed with cancer.

An outbreak of pleuro-pneumonia occurred, and the herd was promptly quarantined and inoculated, and have since been released. Other quarantined cattle have been released. Four diseased animals were destroyed.

DISEASES OF THE DIGESTIVE ORGANS.—A very large number of cases of sickness have occurred during the quarter. Impaction of the omasum, paralysis of the brain, and acute indigestion have been the principal cause of deaths. Over 500 stock were reported as being sick, and over 100 deaths occurred. The actual losses which have not been reported are much heavier. The main cause of the sickness in the majority of cases is undoubtedly the want of proper nutritious food, and unless this is corrected losses will continue to occur. Medicine is of little value without proper food. By judicious feeding and with the assistance of simple drenches of salts, oil, molasses, and tonics, such as ginger, gentian, sulphate of iron, common salt, and doses of nux vomica, the health of the animals may be restored. Salts and hot water and oil and hot water have been tried successfully.

Twenty-seven thousand cattle have been examined during the quarter. The animals killed at the city slaughter-house have been very free from disease. The tracks from Birdsville and Innamincka have been practically closed, only 326 fat cattle being imported from Queensland. Light rains have since fallen, and there will shortly be a resumption of the importation of fat cattle for the Adelaide market. Tick fever has caused a very small percentage of deaths in the Territory, and the stock south of the prohibitory line remains free from cattle tick, the dry climate being unfavorable for its existence.

FERTILISING INGREDIENTS REMOVED BY CROPS.

The following table shows in pounds the amount of nitrogen, phosphoric acid, and potash per acre removed by various crops:—

		Nitrogen.	Phosphoric Acid.	Potash.
Mangolds	{ Roots, 22 tons	87	36·4	222·8
	{ Leaves	51	16·5	77·9
	Total	138	52·9	300·7
Turnips	{ Roots, 17 tons	63	22·4	108·6
	{ Leaves	49	10·7	40·2
	Total	112	33·1	148·8
Swedes	{ Roots, 14 tons	70	16·9	63·3
	{ Leaves	28	4·8	16·4
	Total	98	21·7	79·7
Potatoes	6 tons	47	21·5	76·5
Wheat	{ Grain, 30bush.	33	16·0	9·8
	{ Straw	15	4·7	25·9
	Total	48	20·7	35·7
Oats	{ Grain, 45bush.	38	13·0	9·1
	{ Straw	17	6·4	37·0
	Total	55	19·4	46·1
Barley	{ Grain, 30bush.	35	16·0	9·8
	{ Straw	13	4·7	25·9
	Total	48	20·7	35·7

It will be seen that mangolds and turnips remove more of all three ingredients than any other crop. Wheat and barley remove practically the same quantity of each constituent, while oats remove more nitrogen and potash than either of the other cereals.

SUGAR FROM BEETS.—The Maffra Sugar Beet Company of Victoria is again in difficulties. About £90,000 has already been laid out, of which two-thirds has been contributed from the public funds, and still more is required. It may be interesting to note that in the United States, according to official reports, the cost of producing beet sugar with the most approved appliances is nearly £16 per ton whereas the best cane sugar is sold in Adelaide, after paying duty of £3 per ton, at £17 per ton. Under these circumstances, and with the probability of intercolonial freetrade at an early date, there does not appear to be any prospect of the production of sugar from sugar beets being a profitable industry in South Australia.

ANALYSES OF FERTILISERS.

BY W. L. SUMMERS, INSPECTOR OF FERTILISERS.

In last month's issue the results of the analyses of the bulk of the samples of fertilisers obtained during the present season were published. The following additional samples have since been analysed:—

Bone manure from L. Mehrtens & Co.—13·1 per cent. tricalcic phosphate; 3·74 per cent ammonia.

Bonemeal from Clutterbuck Bros.—37·1 per cent. tricalcic phosphate; 7·48 per cent. ammonia.

Bonedust from Clutterbuck Bros.—37·5 per cent. tricalcic phosphate; 5·44 per cent. ammonia.

Bonedust from A. R. B. Lucas & Co.—“Bally bonemeal, No. 1.”—51·3 per cent. tricalcic phosphate; 49·3 per cent. ammonia. “Bally bonemeal, Nos. 3 and 4.”—53·5 per cent. tricalcic phosphate; 4·93 per cent. ammonia. “Bally bonemeal, No. 5.”—39·5 per cent. tricalcic phosphate; 3·91 per cent. ammonia.

Bonedust from Excelsior Manure Works.—38·1 per cent. tricalcic phosphate; 4·42 per cent. ammonia.

Gladstone's improved fertiliser.—2·5 per cent. insoluble phosphoric acid; 2·2 per cent. potash.

United Alkali Co.'s mineral super. from Geo. Wills & Co.—37·65 per cent. soluble phosphate.

Lawe's mineral super from Elder, Smith, & Co.—37·1 per cent. soluble phosphate.

Thomas phosphate (star brand) from Mr. F. H. Snow.—Samples from three shipments gave 19·9, 18·5, and 18·2 per cent. of phosphoric acid respectively.

Thomas phosphate (Albert's) from Geo Wills & Co.—18·5 per cent. phosphoric acid.

Thomas phosphate (Albert's) from Clutterbuck Bros.—18 per cent. phosphoric acid.

Super. B, manufactured by Adelaide Chemical Works, and obtained at Balaklava.—0·55 per cent. phosphoric acid, soluble in water; 12·8 per cent. phosphoric acid, soluble in citrate of ammonia; 0·31 per cent. nitrogen.

Muriate of potash from Mr. F. H. Snow.—97 per cent. pure muriate of potash.

Sulphate of potash from Mr. F. H. Snow.—97 per cent. pure sulphate of potash.

Kainit from Mr. F. H. Snow.—24 per cent. sulphate of potash; 31 per cent. chlorine (common salt).

In last month's issue the brands of the mineral supers sold by Clutterbuck Bros. were transposed; the correct results of analyses were:—United Alkali Co.'s super. 37·5 per cent., and Ohlendorff's super. 36·6 per cent. soluble phosphate.

The number of parcels of fertilisers sampled by me between January 20th and April 24th is sixty-four. Of these several were from sample lots and a few were from small lots of two or three bags only, the analyses of which were not published. The principal fertilisers analysed were:—Mineral superphosphate, twelve samples; bonedust, eleven samples; Thomas phosphate, twelve samples. On the whole the analyses of the fertilisers compared very favorably with the guarantees of the vendors. With mineral supers. the guarantee was either 35 to 37 per cent. or 36 to 38 per cent. soluble phosphate, and in no case was any sample under the minimum, the average being 37·2 per cent. The guarantee for Thomas phosphates was 17 to 20 per cent. or 18 to 20 per cent. phosphoric acid, and only one sample was under 17 per cent.; this went 15·5 per cent., but as it was taken from two bags of a small parcel only may simply have been accidental. The average of the samples was 18·35 per cent. phosphoric acid. Bonedust varied considerably both in tricalcic phosphate (37·5 to 53·5 per cent.) and in ammonia (3·6 to 5·1 per cent.), averaging 45·37 per cent. tricalcic phosphate and 4·62 per cent. ammonia, being respectively 0·23 per cent. below and 0·25 per cent. above the average of the vendors' guarantees. One point in connection with bonedust particularly noticed was the difference of grinding, most of the samples being rather coarse, due, it is stated by some of the manufacturers, to the fact that purchasers look with suspicion on bonedust unless it is coarse. According to latest American authorities the fertilising ingredients in finely-ground bonedust are of considerably more value than in coarse bonedust. Fine bonedust is applied to bonedust when it will pass

through a mesh of one-fiftieth of an inch. Only five of the fertilisers were more than 1 per cent. in any one constituent below the guarantee of the vendor, three being mixed fertilisers, one bonedust, and one Thomas phosphate.

Two of the fertilisers obtained showed a very low percentage of plant food. Rawson's "patent improved fertiliser" contained 5.5 per cent. insoluble phosphate of lime, 0.51 per cent. ammonia, 1.38 per cent. potash. The price charged for this was £5 5s. per ton. Taking the ammonia at 10s. per unit and potash at 6s. 6d., the average unit values of these fertilising constituents, the insoluble phosphate of lime in this fertiliser would cost the purchaser 16s. 6d. per unit, whereas the average unit value of insoluble phosphate of lime is 1s. 2d. The other low-grade manure was branded "Gladstone's Improved Fertiliser." It was reported to me that this was being offered by the importer to the manure merchants as Thomas phosphate, but, owing to its poor quality, none of the latter had stocked it. The importer stated that, owing to same reason, none of it had been sold by him, and that it was supposed to be a mixture of high-grade basic slag and kainit. A sample was obtained at one establishment from an original bag sent out by the importer as a sample. This had set in a solid mass, and when crushed was very gritty. The analyst's report showed it to contain 2.5 per cent. insoluble phosphoric acid, 2.2 per cent. of potash, and 5.26 per cent. chloride of sodium (common salt). At the prices charged for other fertilisers containing the first two constituents the value of this so-called "improved fertiliser" would be 9s. 4d. for the phosphoric acid and 13s. 8d. for the potash, or £1 3s. per ton.

In the past in this colony it has been the practice to show only the percentages of water soluble and insoluble phosphate of lime in mixed manures. This season one Adelaide firm has shown, in addition, the percentage soluble in citrate of ammonia, and a good many inquiries have been made as to whether this citrate soluble phosphate would be immediately available for the crop. A large number of farmers had purchased as superphosphate a fertiliser containing nearly all its phosphate as citrate soluble, and, being in a dry portion of the colony, they were greatly concerned as to the likely effect of the manure. Most American authorities state that there is little if any difference in the effects of water soluble and citrate soluble phosphate of lime, and that they are about equal in value, sometimes the one and sometimes the other giving most favorable results. The majority of the reports of the American Agricultural Experiment Stations give the value for commercial purposes of citrate soluble phosphate of lime at from 10 per cent. to 15 per cent. less than water soluble.

DIRECT AND INDIRECT MANURES.

Manures may be divided into two great classes: (a) Direct manures, *i.e.*, those supplying to the soil necessary plant food and contributing directly to its fertility; (b) indirect manures, *i.e.*, those influencing the fertility of the soil in an indirect way. Some manures act in both ways, farmyard manure being a striking example. Green manure, sewage, etc., also come under this head. Then, too, lime added to a soil lacking in a sufficiency of lime for the needs of the crop may be classed as a direct manure. In certain cases also salt may act directly as a manure, but these are rare instances; and lime, marl, salt, gypsum, &c., can only be classed as indirect manures. They act upon the soils inert fertilising matter, and by their action convert it into available plant food; besides which, some of them exert a considerable effect on the texture of the soil, thus influencing the result of the crops. Manures such as phosphates, bonedust, guano, sulphate of ammonia, potash, salts, &c., exert only a direct effect on the land; they enrich it in necessary plant food.

FEEDING VALUE OF "COCKY CHAFF" AND STRAW.

A correspondent propounds the following queries :—" Can you give me an estimate of the relative feeding merits of (1) cocky chaff (by which I mean wheat husks); (2) wheaten straw chaff; (3) oaten straw chaff; and (4) prime oaten hay chaff?" To these queries Mr. A. N. Pearson, Government Chemist for Agriculture, kindly replies as follows :—" The composition of wheat husks, oat straw, and oat hay, all calculated to the same amount of moisture, is on the average, about as follows :—

	Total.					Digestible.			
	Moisture.	Ash.	Albumenoids.	Fibre.	Sugar, Starch, &c.	Fat.	Albumenoids.	Fibre, Starch, Sugar, &c.	Fat.
Wheat husks	14.3	9.2	4.3	36.0	34.6	1.4	1.4	33	.4
Wheat straw	14.3	6.3	4.6	35	38.5	1.4	1.2	34.5	.4
Oat straw	14.3	4.0	4.0	40	36	2.0	1.4	40	.6
Oat hay	14.3	6.1	8.4	26.5	42	2.6	4.8	41.5	1.2

The principal constituents to be considered are the digestible albumenoids, which are flesh-formers; and the digestible fibre, starch, sugar, &c., which are heat and fat producers; and also the digestible fat, which is also a heat and fat producer, and has two and a half times the value of the digestible fibre, starch, sugar, &c. The above figures show that there is not much practical difference between wheat husks and wheat straw; that oat straw is 20 per cent. better in heat and fat producers than the other two; and that oat hay is about 25 per cent. better than the first two in heat and fat producers, and is nearly four times as rich in digestible flesh-formers." As "cocky chaff" is largely used for horsefeed by wheatgrowers in the northern areas, the foregoing information should prove interesting and useful to them.—*Australasian*.

WEATHER AND CROP REPORTS.

ARDEN VALE.—During March about 1½ in. of rain fell in fierce storms, causing the creeks to run. More rain is now needed for the early-sown wheat. Season has been favorable for clearing weeds, and the land will go in in better condition than for years past.

BALAKLAVA.—An inch of rain fell at beginning of month, starting the feed and some of the rubbish. Farmers are busy scarifying the fallows; some have started seeding, but the majority are waiting for rain, which is badly needed. One farmer has on new land a crop of seventy acres through the ground.

BOOLEROO SOUTH.—Seeding is in full swing, the first sown wheat being up nicely, but more rain is needed to keep it growing. The seed drill is being tried this season to a considerable extent. A disease somewhat like staggers has broken out amongst the horse stock.

CHERRY GARDENS.—The splendid rains during last month caused better growth of feed than we have seen at this time for several years. Stinkwort has grown very vigorously during the past season. Two or three light frosts have been experienced, but not much damage done.

CRYSTAL BROOK.—The past month has been rather dry and the grass has not grown as well as it promised. The early rain started the rubbish and enabled farmers to kill the weed on the fallows. Seeding is being pushed on and a few early sown crops have started, but they are sadly in need of rain. A large area is being sown by means of the drill.

GAWLER RIVER.—Rain is badly needed to keep the feed alive and to facilitate seeding

operations. On some of the fallows which were scarified after the February rains the crops are up, but most farmers are waiting for rain. Feed is again scarce, the dry feed being partly spoilt by the early rain, and the young growth is going back owing to absence of rain. In some cases water is running short.

INKERMAR.—Seeding is in full swing, but the land is getting very hard, and more rain is needed. Fall for four weeks 2·12in. in some parts of the district, but much less in others, the rain being very patchy.

KAPUNDA.—Some farmers have started seeding, and operations will soon be general, the middle of April to end of May being best time for this district to sow for a wheat crop. Few farmers are putting old land under crop unless fallowed or manured. Stock are in good condition. The feed made an early start, but has not made much headway during past two or three weeks.

KINGSTON ON MURRAY.—The crops in this district are coming on well, the weather being very favorable.

LUCINDALE.—Three weeks of warm dry weather, with one or two frosts, has greatly retarded the growth of early feed, but splendid rains have just fallen. Lambing has started, but the percentage will suffer owing to ravage of foxes. Ploughing will soon be general, the land being in good condition, some crops being already sown.

MILLICENT.—The first part of the month was very favorable to growth of grass and early green feed, but since we have had hot dry weather. A large area of land is being prepared for crop. Potatoes in some localities are turning out well, but in many instances the crop will be very light. A few light frosts have checked the grass somewhat, but the country has the appearance of spring rather than autumn. Rainfall for April, to 20th, 0·370in.

MORPHEIT VALE.—The season has opened fairly well, though the weather was very warm and dry for about two weeks. The grass has made fair growth, and lambing has started. Seeding has commenced. The area under crop will hardly be as large as last year, but most of it is fallow, and much is being manured. The vintage was more or less a failure, the crop being little more than half the average.

MOUNT COMPASS.—Rainfall for March over 2in. Harvesting the late potato crops is in full swing. Some of the onion crops are turning out well.

MOUNT REMARKABLE.—Nice rains have fallen since previous report, totalling 2·4in, but the weather has become hot and dry, and more rain is needed. Feed is springing nicely, but needs more moisture. There is a large area already sown, and a good deal of the crop is above ground and looking healthy.

MURRAY BRIDGE.—Nice rains fell at end of March, starting grass and weeds and enabling farmers to plough, but it has become hot and dry again. In a few small paddocks the wheat is above ground. The seed and fertiliser drill is becoming a general farm implement, most farmers having one at work. Stock still in fairly good condition.

PINE FOREST.—Since last report we have had an $\frac{1}{2}$ in. of rain, sufficient to start most of the rubbish. Green feed soon made its appearance, but is now at a standstill owing to the hot dry weather. Most farmers have commenced seeding, but some are delayed by late delivery of manure. Stock are in fair condition.

REDHILL.—Water-carting still goes on in this district, though patchy, but heavy rain fell three weeks ago. Grass is showing well where the best rains were experienced, and the lambs will benefit accordingly. More rain is needed. Some farmers have started seeding, but others are waiting. Commercial fertilisers are being used on a large scale.

RIVERTON.—Weather has been very warm and dry; rain is badly needed to start seeding.

STRATHALBYN.—The weather has been very dry, and ploughing is much impeded for want of rain. The grass is turning yellow and will die out unless we soon get a change. Stock are in fair condition.

YORKETOWN.—The weather keeps very dry, and a good fall of rain is needed. Stock look well.

EDITOR'S NOTE.—The Editor will be glad if correspondents in districts not represented in these reports will furnish concise notes not later than the 25th of each month.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

April 29, 1899.

April opened auspiciously, but a period of unseasonably hot dry weather setting in not only burned off growing feed in most exposed places but caused considerable anxiety to the farmers. During the past ten days, however, favorable weather has been again experienced, and agriculturists are now more hopeful. In many districts, encouraged by the success attending the use of manures last season, fertilisers are being employed much more extensively than heretofore, especially on worn out lands. Pastoral prospects are more favorable than for several years, and the lambing gives promise of being good.

In breadstuffs the local market shows a slight improvement on values ruling a month ago, but no material rise in wheat can be recorded, price in the Northern Hemisphere having fluctuated not more than 1s. 6d. per quarter. During the next six or eight weeks weather conditions, particularly in America, must largely influence price for the coming season; with prospects, however, generally favorable at the beginning of May, the chances in Europe and America seem favorable for an average crop. Local flour quotations are a shade higher in sympathy with slight improvement in value of wheat. Heavy demand has been experienced for miller's offal lines. Feeding grains are firmly held. Hay and chaff have been in better demand.

Our market has been mostly supplied with potatoes from the Mount Gambier district; dealers there, however, had forced the price up, whilst intercolonial tendencies were towards lower rates with the result that a 5s. advance—for a few days has caused a reaction of at least 10s. per ton, with buyers very much disinclined to operate, as intercolonial samples are being offered cheaper and in excellent condition. Local onions have been supplying the market, but are now about used up, so that the South-East may be expected to exercise a controlling influence on this line during the remainder of the season, the crops there turning out heavier than at one time expected, whilst the quality is reported very fair.

A satisfactory month's business has been done in dairy lines, but, in consequence of the dry hot spell previously referred to, the expectation that this colony would ere now be self-supplying in butter has hardly been realised, a slight shortage still having to be made up by importation; but the last rains ought to place us soon in the position of having at least sufficient for requirements. There is still some stored in the refrigerating chambers, which owners are anxious to quit; but the quality is not good enough to permit of its taking the place of imported fresh. Eggs have had a strong advancing market during all the month, although supplies are heavier than at this time in preceding couple of years. Western Australia continues to absorb all we can provide, with buying orders still unfilled. Bacon improved slightly for a week or two, but is again as last quoted. The turnover in this line is exceptionally large, no doubt owing to the comparative dearth of butchers' meat. The same reason has also influenced somewhat the demand for cheese, which is heavier than usual, whilst, of course, its cheapness encourages sale. Business in honey has been somewhat dull, but several good parcels have been placed at quotations. Beeswax has good inquiry. Almonds scarce.

With the change to cooler weather conditions the usual winter sale of carcass meat has commenced, and good competition is being experienced for suitable pork and veal. Dressed poultry is also realising satisfactory prices. In live poultry all good table stuff finds ready buyers, but light, poor and weedy birds have been neglected, and now that supplies are again plentiful some breeders will have to put their stock in better condition before forwarding to market, if they wish to obtain anything above miserable rates. There is an excellent export market for poultry to be easily won in Western Australia—which we already supply with eggs from our colony—but we have to compete with Melbourne and Sydney, and can only gain a hold by raising good stuff, for which, however, buyers are willing to pay well, and it would be much more profitable to producers than marketing poor birds.

MARKET QUOTATIONS OF THE DAY.

Wheat.—At Port Adelaide, 2s. 7d. to 2s. 7½d.; outports, 2s. 5½d. to 2s. 6½d. per bushel of 60lbs. Flour.—City brands, £6 7s. 6d. to £6 12s. 6d.; country, £6 to £6 5s. per ton of 2,000lbs. Bran.—8½d. to 9d.; pollard, 9d. per bushel of 20lbs.

Oats.—Local Algerian, 1s. 6d. to 1s. 8d.; good stout white, 2s. 4d. to 2s. 8d. per bushel of 40lbs.

Barley.—Malting, 2s. 6d. to 3s. 6d.; Cape, 2s. per bushel of 50lbs.

Chaff.—£3 to £3 5s. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.

Potatoes.—Mount Gambiers, £3 16s.; Tasmanians and New Zealand, £3 10s. to £3 15s. per 2,240lbs.

Onions.—£4 5s. to £4 10s. per 2,240lbs.

Butter.—Creamery and factory prints, 1s. 1½d. to 1s. 3½d.; dairy and collectors' lines, 9d. to 1s. per pound.

Cheese.—S.A. Factory, best, large to loaf, 6d. to 7d. per pound.

Bacon.—Factory-cured sides, 7d. to 7½d.; farm lots, 6d. to 6½d. per pound.

Hams.—S.A. factory, scarce, 7½d. to 9d. per pound.

Eggs.—Loose, 1s. 3d.; in casks, f.o.b., 1s. 5d. per dozen.

Lard.—In bladders, 5d.; tins, 4d. per pound.

Honey.—2d. for best extracted, in 60lb. tins; beeswax, 1s. per pound.

Almonds.—Soft shells, 4d.; kernels, 10½d. per pound.

Gum.—Best clear wattle, 1½d. per pound.

Poultry.—Good roosters, 1s. 4d. to 1s. 8d. each; medium to fair, 10d. to 1s. 2d.; fair hens, 1s. to 1s. 4d.; poor-conditioned fowls difficult to quit at 7d. to 9d.; ducks, 1s. 9d. to 2s. 4d.; geese, 2s. 3d. to 2s. 9d.; pigeons, 4d.; turkeys, from 4d. per pound live weight for fattening sorts to 5½d. for fine table birds.

CONFERENCE OF SOUTH-EASTERN BRANCHES.

On March 29 a conference of the South-Eastern Branches of the Agricultural Bureau was held at Naracoorte. Enthusiastic committees for programme, exhibits, receptions, and refreshments had been meeting and working for some weeks previously, and this accounts for the unqualified success of the undertaking. Much credit was given to the ladies' refreshments committee, under the able presidency of Mrs. McGilchrist, and Mr. S. Schinckel as Hon. Secretary. The exhibits of farm, dairy, orchard, and garden products, home industries and manufactures, and utilised waste substances were very numerous, excellent in quality, showed great taste, industry, and ingenuity, and were intensely interesting.

Proceedings.

Mr. Oliver Hunt, Chairman of the Naracoorte Branch, presided, and welcomed the following visitors from Branches:—Naracoorte—Messrs. S. Schinckel, J. Wynes, G. Greenham, E. C. Bates, J. D. Smith, A. Johnstone, H. Buck, G. Wardle, H. Smith, and D. McInnes (Hon. Sec.). Lucindale—E. Feuerheerdt, B. Feuerheerdt, L. McInnes, A. Matheson, S. Tavender, G. C. Newman, A. Lobban, A. Dow, and H. Langberg. Tatiara—T. Stanton, W. E. Fisher, C. H. W. Wiese, D. Makin, T. Hall, and J. Rankine. Millicent—R. Campbell, and H. F. D. Holzgreffe. Penola—J. A. Riddoch, E. A. Stoney, J. W. H. Sandiford, R. Fowler, J. Warner, D. McKay, J. T. Morris, and Dr. F. Ockley. Mount Gambier—J. Umpherston, J. Watson, J. C. Ruwoldt, T. H. Williams, A. J. Wedd, and E. Lewis. Central Bureau—Professor Lowrie M.A., B.Sc. (Principal of the Agricultural College, Roseworthy), Professor A. J. Perkins (Government Viticulturist), C. J. Valentine (Chief Inspector of Stock and Brands), and Geo. Quinn (Inspector of Fruit). There were also a great number of the public present, and about twenty agronomical lassies and lads from the local school under the control of Mr. E. A. Wittber. These latter, as well as the members of Branches, were provided with refreshments by the ladies' committee.

Several prominent persons had been invited to be present, but found it impossible to attend. Amongst numerous apologies on that account were included the Hon. R. Butler, M.P., Minister of Education and Agriculture, Mr. G. S. Thomson, Government Dairy Instructor, and the Chairman and Secretary of the Central Bureau.

The Chairman remarked that, as this was the first conference that had been holden at Naracoorte, the visitors must not expect too much. He was glad to see so many present, and so many excellent exhibits of products, manufactures, and industries. Much good must inevitably result from these conferences, and he referred to several of the advantages that accrue. The good work done by the Bureau as a whole, and by individual Branches and Branch members, was strikingly apparent in the reports, &c., published in the official *Journal of Agriculture and Industry*. He referred to the promising season just opened, and hoped that yields in agricultural, pastoral, and horticultural industries would be abundant, and prices turn out satisfactorily. He directed attention to the splendid show of products, &c.

Exhibits.

NARACOORTE BRANCH.—Large collections of apples, pears, quinces, grapes, peaches, plums, melons, nuts of sorts, dried and preserved fruits, agricultural roots of many varieties, sorghum, maize, lucern, kale, and many green fodders, culinary vegetables, sunflower seeds, &c., wheats, barleys, oats in grain and in the straw, models of patent horse-feeder, and automatic sheep-feeder, sheaves of various grasses, native saltbushes and other articles.

PENOLA BRANCH.—Very large collection of apples, pears, grapes, peaches, almonds, lemons, quinces, tomatoes, Coonawarra clarets, onions, potatoes, peas, beans, and many other articles from the Fruit Colony and from Yallum.

LUCINDALE BRANCH.—Collections of apples, pears, grapes, peaches, lemons, essential oil of peppermint, Romney Marsh wool, wheats, barleys, and oats in grain and in straw, maize, kales, mangolds, grasses, clovers, fodder roots, bulbs, etc., marrows, onions, vegetables, potatoes injured by mole crickets and specimens of the insects, maize, &c.

MOUNT GAMBIER.—Very extensive collections of apples (one exhibit with forty varieties), pears, quinces, walnuts, twelve sorts potatoes, onions, sunflowers, millets, sorghums, wheats, oats, &c.

MILLICENT BRANCH.—Fourteen sorts potatoes, one bulb kohlrabi, 14lbs., tree lucern, green foddors, grasses, sunflowers, salbushes, and other exhibits.

ADDRESS BY MR. C. J. VALENTINE—The Chief Inspector of Stock and Brands was called upon for a few remarks. He said he was sorry to miss the presence of the Hon. Minister of Agriculture and some others at this large representative meeting of agronomists. A few years ago it would have been difficult to get so many producers together from all parts of the district, but thanks to the organization of the Agricultural Bureau this was now made an easy matter, and many other advantages had resulted from its establishment. A lively interest was being shown in every agronomical pursuit, being led by some of the most intelligent men in each district, and these annual conferences enabled them to disseminate useful knowledge, and encouraged them to progress in the various industries in which they were engaged. Co-operation in dairying had lifted the industry from torpor into activity and prosperity. With the advice and assistance of the Government Dairy Instructor the dairying industry would make much more rapid development. He was much impressed with the magnificent show of produce—especially fruits—on the tables. For export purposes, there was no part of Australia better able to compete in the world's markets than the South-East. This was the seventh conference that had been holden in that part of the colony, and whilst congratulating Naracoorte upon the success of the present meeting, he was sure that all present would benefit largely from the papers, discussions, and generally from the meeting together of so many well-informed and practical occupiers of the soil.

Agricultural Shows.

For Mr. Jas. Fowler (Chairman of the Penola Branch), Mr. E. A. Stoney read a paper, of which the following was the purport:—

This paper was written with a view to start a discussion upon Professor W. Lowrie's address at the latest Congress of the Bureau in Adelaide upon the same subject. It had been suggested that the subsidies granted to agricultural societies are not invariably employed in the way it was originally intended they should be used. In the main, the people engaged in conducting these annual shows are practical men, who in many cases give money, time, and best abilities for the public good, with a sincere desire to benefit the producing interests. That their efforts are appreciated is emphatically proven by the great interest taken in the shows by those most concerned. There seemed to be a consensus of opinion that these competitive exhibitions of products, or of the effects of breeding of horses, cattle, sheep, &c., are useful. He thought the value of the lessons thus given would be enhanced, and the decisions give more satisfaction, if the judges in some cases would give reasons for their awards. He thought these country shows marked the progress made in the districts where holden, and exert a powerful influence for good. They enable persons who cannot attend the larger and more distant shows to benefit from the object lessons presented by their local shows. If some local shows are "merely social engagements, at which people gather to chat about things in general, and each other in particular," as stated by one of the leading daily papers, he agreed that such exhibitions have yet to justify their existence. That observation emphasized the necessity for most careful selection of officers to carry out the real object of the shows. It would be a pity if a little real pleasure could not be combined with business, and shows would probably lose much of their interest if sociality were eliminated. The same paper had

said—"Emphatically the commercial victory is won by the up-to-date man. Brains are required in farming as they were never before. The chemist and the machinist are indispensable co-operators with the man who holds or directs the plough or supervises the stock farm." This was absolutely correct, and led to the subject of agricultural education. Unfortunately, our Agricultural College, with its competent staff, is not within reach of all. Still, it ought to be visited at every possible opportunity. In concluding, he thought that the small shows, as at present conducted, do a vast amount of good, and that anything that would tend to decrease their usefulness would be a distinct loss to the district in which they are held, and detrimental to agricultural interests generally.

Mr. D. MCKAY, Penola Branch, said many country people failed to agree altogether with Professor Lowrie in the paper referred to, and he was one of them. In Melbourne and in Adelaide he had noticed that exhibits from the country took the principal prizes. Horses from South-East had taken the prize for hunters at Adelaide Shows, and Yallum and Hynam sheep had taken prizes in Melbourne. If country shows were discontinued it would be a great loss. They could not see better exhibits at the Adelaide Show than at country shows. Some amount of sociability and enjoyment was properly attached to the country shows. He would ask if the Professor desired to do away altogether with country shows?

Mr. W. F. LOUTIN thought it would be impossible to do away with country shows. There were many who could not get away to distant shows, and he would defy Adelaide or Melbourne to put up better exhibits than they had at present before them. He wished farmers would take more interest in their local agricultural societies. Usually the working committees consisted of five or six townsmen. They ought to be chiefly farmers.

Mr. ROWLAND CAMPBELL, Millicent, in the main agreed with the Professor. He did not understand that he wished to do away with the country shows altogether, but rather that there should be fewer country shows and much larger prizes. With exception of horses exhibited at the shows they would find very few good hacks in the district. One horse was generally got up specially and taken to all the shows, and the same might be said of all show stock. They are generally mongrels fed up. The Agricultural Bureau Branches could hold shows without lavish expenditure, and he would himself take more trouble to exhibit at a show of this kind than at one where the main object was money-making. Ordinary shows were mostly of a horsey character, and if the "horses in action" part were removed from the programme, the show would fall flat. What had buck-jumping contests done for improving the breed of horses? Very insignificant prizes were offered for such things that tended to make happy homes and smiling faces, and were nearly altogether neglected. Chicago was built up on the pork industry, but the prizes offered in our South-East would not pay for "the squeal."

Mr. H. SMITH said that he had been successful for two years running in taking prizes for his sheep at the Adelaide Show, and then the management limited the competition to within 200 miles of Adelaide. That was not encouraging country exhibits.

Mr. J. UMPHERSTON said he agreed with Professor Lowrie for the most part, and there was great necessity for improving the stock of the colony.

Mr. D. MCKAY said the buck-jumping contests, &c., brought in gate-money, which was devoted to prizes for more useful exhibits.

Professor W. LOWRIE said that he did not advocate that *all* the country shows should be abolished, nor that there should be only one central show. The *number* of shows should be reduced, larger "district" shows organised, and the work and money that is now divided amongst the numerous small shows should be concentrated upon the larger district shows. There was stock in the South-East that could compare with that of any part of the colony; but that was in favor of his contention. It was said in other districts—"How

can we compete with men like Angas and Murray? We have not the money.' But that was neither fair nor to the point. It was not "money" but "the man" who understood the breeding of stock. At home a poor man (Cruikshank), who understood stock breeding, took champion prize for Hereford stock against the aristocracy of England. Because so much time and working power was taken up in organising the multitude of small shows, the Adelaide show was reduced to the position of a district show. If they are carried out rightly, agricultural shows could be made beneficial to the agricultural industry. In Great Britain farmers looked upon it as a first duty to become members of the national societies, and as a second duty to be a member of their own district society. These national shows could afford to offer prizes that would attract good exhibits, and get the brains to devise the best means of producing the animals desired. The officers of the many local shows here were generally prominent men who could not spare the necessary time to getting up a really good show. We ought to have shows that would bring stock from New Zealand and all the other colonies, so that we might attain perfection in each class, and compare our best with their best. If we could offer £200 or £300 for an entire horse, and the winner were left in the colony, it would greatly benefit the agricultural industry. They should confine agricultural shows to agriculture, and social functions should be separate. The reason they found farmers not working for the shows was that they recognised that the prizes offered brought animals that were not worth inspecting. Take for instance the prize-list of the local show. There they found in a district where surely sheep were an important exhibit a prize of £2 2s. for the champion. Then turning over to farm implements and conveyances they found £1 for the best single buggy and a certificate of merit for the best double-furrow plough. Was a buggy likely to do much good to the district? In the case of the plough, which many farmers had, there would be competition if a substantial prize was offered; and if a trial was made it would add still greater interest to the competition. It was for reasons like this that he would like to see say one show in the South, two in the North, and one central show, at which it would be worth the farmer's while to stay a week instead of a show at which everything could be seen in two days and a half, like the Adelaide show could now.

The Roseworthy Agricultural College.

Mr. B. FEUERHEERDT, Lucindale Branch, read a lengthy paper, of which the following is an abstract:—

No doubt there are a few amongst us who take a deal of interest in the college, but there will also be those who know very little of the institution. It is to the latter chiefly that I now address these few remarks. It would be a mistake to imagine the institution situated on the best of soil and with a 26in. rainfall. Such is not the case. The average rainfall during the three years in which I attended it was about 14in., and the soil at the time when the college was founded was decidedly poor. The land had been under wheat for many years before, and was thoroughly wheat-sick and exhausted. The site was chosen to show the agriculturalists of South Australia what could be done on the land under the most adverse conditions. Now, at harvest time, you can see that the institution is not failing in its purpose. The farm consisted of about 820 acres of land, about 250 acres annually under cereals, and about 40 acres under vines and fruit trees. Within the last three years the area of the farm has increased considerably. Formerly the area was not sufficient to admit of any number of sheep being run on the premises all the year round; whereas now, I believe, the Professor has charge of a small flock, and will be able to put into practice his scientific principles of sheep-breeding and management for the benefit of the students. The entire work of the farm is done by the students. Work of all descriptions, from driving the binder down to feeding pigs, even the butter and cheese-making, is done by the students. Under the supervision of Professor Perkins they do the work of the vineyard and orchard, work such as ploughing and cultivation of the soil, pruning, grafting, and when vintage comes the picking of the grapes and wine-making. The course of viticulture and wine-making alone, under such an expert as Professor Perkins, should be of inestimable value to any student who intends to follow up

that practice in after life. The range of subjects taught is fairly large. Science and practice of agriculture is taken by Professor Lowrie, M.A., B.Sc.; science and practice of viticulture, Professor Perkins, Government Viticulturist; theory and practice of fruit-culture and theory and practice of wine-making, Professor Perkins; veterinary science, Professor Lowrie; chemistry, Mr. Jamieson, B.Sc.; surveying, Mr. Bosworth; bookkeeping, Mr. Haaslam; farm foreman and instructor, Mr. Charles Jarman. The student has every opportunity of learning placed before him, and if he does not avail himself of it, the college is not to blame. The students are divided into batches. While one batch is receiving lectures, the other is out in the farm and vineyard engaged at practical work. At midday the order is reversed. The batch that had received lectures during the morning go out to work, and the other lot go into the lecture room. The hours of work start at 7 a.m. and knock off at 5.30. At harvest time harvest hours are kept. The variety of wheats grown each year is large, and offers the students a good opportunity of comparing their relative merits and rust-resisting qualities. Each year Professor Lowrie conducts a series of experiments, and shows the results of manuring, and that there cannot be the slightest doubt that the correct applications would be profitable to the wheatgrower. Each year a field is chosen for this purpose, and divided into a great number of blocks of equal area, generally about three acres each. A number of these blocks are sown first with the various fertilisers alone. For instance, one would be sown with superphosphate, another with basic slag, another with sulphate of ammonia, and so on right through the whole list of manures. Then another lot would be sown with the various blends of these manures and in various proportions. Throughout this whole series of plots an occasional one will be left totally unmanured. When harvest time comes the results from all these various blocks are kept separate and weighed. To any wheatgrowers who should still be doubtful as to the practicability of applying fertilizers with profit, it would be worth while to visit the college farm just before the harvest time, and in most cases the information gained would be full compensation for their railway expenses. In 1895 the crop averages were for hay, two tons per acre; and for wheat, 18 bushels per acre. Compare these results with those of adjoining farmers. Two out of four failed to get their seed back, the third harvested six tons of hay from a 30-acre paddock, and the fourth stripped four bushels to the acre. In all four of these cases there was only a road or fence dividing their fields from the Government farm. Now, ask these men why the Government crops should be heavier than their own. They will tell you promptly that the reason is because the Professor manures his land, and that they would do the same if they had the Treasury to back them up. Ask them what manure was applied, how much, and what it cost. They do not know, and what seems more strange, they do not seem anxious to know. It is a great pity that so many farmers in the North and the South-East are prejudiced against the institution. There is at the present day many a hard-working honest old farmer who, in spite of all his years of experience, is beginning to find it is difficult to make a living on his land with his old methods of cultivation; even his choicest pieces of soil are commencing to fail. What will it be in ten years' time, and what are the prospects of his sons, unless some change is brought about? The only thing that can bring about this change for the better is the use of fertilizers. Either farmyard manure or commercial will have to be used, and the sooner the better. When a farmer in good circumstances says he cannot afford to send his boy to Roseworthy for three years—"He is too handy at home, you know, feeding pigs, hoeing weeds"—little does he know of what he is depriving his son, and how it will affect him in after years. With the present condition of our soils and the rapid strides which the advancement of agriculture is making in other countries, it is really necessary to give the rising generation of farmers every possible chance of acquiring the more modern and scientific principles of agriculture, in order that they may compete more successfully against other countries. There cannot be the slightest doubt but that South Australia was most fortunate in obtaining two such capable experts as Professor Lowrie and Professor Perkins. The knowledge which these two men are continually distributing far and wide through South Australia, both through lecturing in the various districts, and through the number of students which are yearly under their supervision, is bound to improve the general methods of agriculture, and also hasten the advancement of the wine industry. With improved methods of cultivation and a more general use of commercial fertilizers, the output of grain and produce is bound to increase, and the prospects of the colony should brighten considerably. There will be a greater employment of labor, the returns from our railways will be higher, and besides this the amount and interchange of money will increase also. Financially speaking, the Roseworthy Agricultural College is an annual loss to our Government. With the student's fees at £30 per annum, and placed under such adverse conditions, it would be very unfair to expect the institution to be self supporting. The object of the college was never intended to provide a direct source of revenue. It is in an indirect way that the benefit of the colony will come about. It may be years before it will make itself felt, but the effect will come, slowly perhaps, but surely. The life of the student on the whole is pleasant, full of interest, and remarkably healthy. The food, although plain, is wholesome, and the accommodation is all that could be desired. There is one point which I would suggest as an improvement. The age of admittance should be raised from 15 years to 16. At the age of 15 the student is too apt to look upon the duties as a task, and will not take full advantage of his

opportunities as will one of more mature age. Rather let him spend the extra year or so in acquiring a good sound education. It will be of much value to him at the college, and will simplify matters a great deal for the students and their masters. Any praise that I may have accorded the institution is not more than is due. I have always felt that it was my duty, not only to the college, but also to the people of South Australia, to make known as well as I can a few of the many benefits that may be derived from this institution.

Adjourned for luncheon.

Ploughs and Ploughing.

PROFESSOR W. LOWRIE, M.A., B.Sc., Principal of the Roseworthy Agricultural College, opened an address upon this subject by congratulating Mr. Feuerherdt, one of the former boys of the Roseworthy College, on the paper he read before lunch, and made some interesting remarks concerning the work of the college in relation to its financial position. The Professor then, in referring to the old modes of cultivation, gave a succinct history of the modern plough; compared the functions it performed in relation to the old modes of cultivation; dwelt on the necessity of cultivating the land well; preferred an implement that broke the land up thoroughly to one that did neat ploughing and prepared smooth seed beds; and expressed his preference for a plough, the weight of which was thrown on four wheels, with no sole plate, no check plate, and having only a place of rest for the mould board; made of spring steel instead of iron, with mould-board specially chilled so as to have a fine polish. He dwelt on many other points, and counselled the farmers to test the draught of their implements. A plough made in Ardrossan (S.A.) was near his ideal, and he had a partiality towards the disc plough that had been tried at Naracoorte the other day, on account of its breaking up the land thoroughly.

Mr. UMPHERSTON did not altogether agree with the Professor, and considered the disc plough not suited for Mount Cambier, as it did not cover the weeds. Neat ploughing was necessary to cover weeds. The Professor said his ideal plough should be suitable for the greater portion of the colony, and usually farmers were not troubled with an excessive quantity of weeds.

Farmers' Co-operation.

Mr. R. CAMPBELL, Millicent Branch, read a paper on this subject, as follows:—

The average farmer is an individualist, with here and there a slight progressive tendency, which announces itself in a so-called co-operative butter and cheese factory, which is generally only a joint stock company of limited liability, but the greater potentialities of true co-operation do not seem to come within his intellectual grasp. However, it is hoped by continual "pegging away" he will realize some of the possible advantages to be gained, and will then "hustle around" and reap the benefits. Someone has said "Farmers should organise. Each acting for himself renders this powerful class helpless. For the hard working million farmers who are willing to get together, keep together, act together, and co-operate in many ways, there is a bright future." Generally, when the subject of co-operation is broached, the following reply is made:—"Yes, I believe in co-operation, and certainly think a co-operative store would be a good thing." In the writer's mind the co-operative store is about the last thing a farmer wants. If he has not learned to take advantage by co-operation with his fellow farmers to make most of the few lines of his own craft, how can he expect successfully to deal with the hundreds of lines about which he knows nothing. The only successful movements of this kind have had very small beginnings, and the business has been learned gradually and increased as the necessities required. To start a co-operative store with paid managers and assistants is not a riskless undertaking, but for farmers to combine and place their stock and crops to the best advantage is a much less risky matter. The writer has seen fat sheep delivered to a dealer at the farmer's gate, driven direct to the local sale yards, and sold to another dealer to be trucked to the Adelaide market, to be sold again to the butcher through the agency of a third auctioneer or salesman. By having a local office the markets could be known, and the despatch of stock regulated. Grain could be sold in large parcels, and so realise better prices. Arrangements could be made with shippers, cornsacks and wool bales could be bought in as large parcels as all the present local dealers combined would make, and so get them cheaper; and could so make their arrangements that there would not be the

remnants of several stocks to hold over for next season. The middleman, be he the buyer of the farmer's produce or seller to the farmer that which he requires, takes certain risks and allows for them, and, I suppose, generally allows a little over for contingencies. All that the other fellow does the farmer can do himself by combination. All risks would be shared equally, and when the unforeseen and allowed for did not happen the farmer would get the benefit. In America the farmers have their institutes, their granges, and other combinations, and work them for all they are worth. Especially amongst fruitgrowers are these co-operations to be found and work well. They buy, sell, and exchange products, getting as near to the producer on the one hand and the consumer on the other, thus buying cheaper and selling dearer than they otherwise could. Some farmers hold the opinion that because the middlemen are consumers of farm produce they are to be tolerated; the produce consumed and the profits made are not at all commensurate. If the middleman is not supported he will, they say, become a producer, and so be in opposition. Well, let him. You can stand him better in that capacity, for at least you will not have him on your shoulders. The farmer is not in business for fun or philanthropy, but for a living, and if he can, by combination with his fellows, make that living easier attained and enjoy more leisure, why should not he. Who comparatively enjoys the most leisure and luxury? Is it the farmer or middleman who enjoys the most leisure? Brother farmers, every luxury and leisure enjoyed by those who stand between you and the consumer of your products, or you and the producer of what you consume, is at your expense. The facilities of transport are greater than ever they were, and should be taken advantage of to their full extent. The details of organisation are not here entered into; they have been gone over time and again. Time, paper, and ink have been wasted over them, and until farmers realise the present arrangements are not the best that they could be they will still be wasted.

Mr. A. CALDWELL agreed that co-operation, when conducted on well-understood business lines, would be highly beneficial; but business had been reduced to almost a science, requiring very special training, and the middlemen might be regarded as experts. Farmers often made more profits by employing these experts than they could do by trying to conduct their own business. An attempt had been made by farmers around Naracoorte to ship their wheat direct to the home markets, but it had been a difficult job to make it a going concern. In some cases the farmer who attempted to do his business without the aid of the expert might find himself in a bad position. By all means let farmers co-operate, but let them be careful not to get out of the frypan into the fire.

Mr. FISHER took the opposite view to Mr. Caldwell. What Mr. Campbell combated was the employment of too many and unnecessary middlemen. There was no occasion for so much of the agency business as was existent in the colony now. One of the best instances of co-operation in South Australia was the Farmers' Co-operative Union. He thought the farmers should strike out a little more in the way of co-operation. There were, of course, lines the farmers should not touch.

Mr. CAMPBELL replied. If Mr. Caldwell were not a hard-headed Scotsman he would think he was making fun of him. One thing farmers could advantageously co-operate in was the purchase and analysis of fertilisers. They would secure the best fertilisers, and save a considerable sum per ton by it. They could also co-operate for the selling of various kinds of produce.

Pruning and Planting Fruit Trees.

Mr. A. JOHNSTONE, Naracoorte Branch, read the following paper:—

In submitting this short paper to you I do not pretend that it is either educational or perhaps altogether practical in this country. It is simply retrospective of some of my experiences in my occupation as a gardener in older countries. The old Scotsman's injunction to his son was—"Aye, be pittin' in a tree Jock; it'll be growin' while ye're sleepin'." And in this Australia of ours when an industrious man acquires a block of land and has built a house on it one of the next best things remaining for him to do is to plant a few fruit trees. They will grow while he sleeps; and while they may not serve the purpose of the Irishman's pig in "paying the rent," they will be more of an embellishment to the home—their products are as useful, and perhaps more imperatively necessary, to us in our tropical climate. There is a right and a wrong way to put in the trees, and their subsequent treatment when they have been put in. Since I got my first lesson there has not been much alteration in the opinion of experts as to the care necessary in planting for good results. Trees

are sent out from nurseries in all sorts of conditions. While some have been taken up carefully, others have been literally been torn up—their roots, or what remains of them, are cut, split, and twisted. It is absolutely necessary for their future well-being that they are carefully examined, and a clean cut made above all the lacerations, the top pruned hard back to three or four eyes or buds from the main stem. Allowing that the ground has been well broken up so that there can be no superfluous moisture or lodgment of water about the roots, the holes are dug at the distance apart intended. Raise the centre of the hole to resemble half a ball, or convex in form; place the tree on the centre of it, then spread the roots regularly out all round; fill in with fine soil; if there are any wood ashes about mix a little over the roots, or, in heavy soil, a little sand, as they both promote root action. Be careful not to have the roots one-sided, as the more regular the distribution of the roots are so will the flow of sap, as also the form of your future tree, and it will be the more firmly fixed in the ground. I know a great many trees have been bought at auction sales. Their roots have been exposed to the air for a week or more, and, therefore, their terminal points, which supply the spongioles for sucking the moisture from the ground, are perished. They are put in as they are in holes hollowed out in the centre in unbroken land and undrained. The holes become full of water, which does not dry up sufficiently quick to give the roots a chance to start before the summer heat is upon them, and the consequence is that they mostly all die. They have not been pruned at either root or branch, and perhaps just as well, as it saved time at planting. That is how not to do it. Now, as to the subsequent training of the young trees. During the last forty or fifty years many systems have been tried, some of which are much older, and nearly all have been extolled as being the most fruitful, while some are merely ornamental. First of all I will take the useful. The natural form of the apple tree being short-stemmed and spreading, I think the nearest in cultivation to which we approach that form gives the best all round results. In maturity it gives biennially a full crop of marketable fruits, and requires little or no pruning. For cider, fruit, or general market purposes, I believe it to be the best form of cultivation. It was the principal form in use forty or fifty years ago. Then came the tree with a stem of from 12in. to 18in. high, open in the centre, the branches being trimmed all round, which gave to the tree the form of a wineglass. Under this system we get a tree that is easily sprayed, easily pruned, and the fruit is not easily blown down, and it is easily gathered in a healthy condition. It produces a medium crop of good-sized fruit. Then there is the horizontal form, for which some apples and most of the pears are specially adapted. It is a style of training which takes up little room and practically shades only itself. Trees trained thus are thrown into bearing much sooner than by any other system, as it employs the sap in the elaboration of fruit spurs instead of its rushing straight to the tips of the branches. Next to this is the fan shape, which is most especially suited to walls, although it is carried out on trellises. But for quick fruit production and of good size the horizontal is the best of the two. Some of the ornamental forms were termed cordon, lateral cordon, bi-lateral cordon, oblique, &c., and may still be seen in the gardens of the old land. The pruning was done once a year when the trees had finished their growth, and thoroughly ripened their wood. Seven or eight years in many instances elapsed before any fruit was seen or expected. But what do we find here? Up to a few years ago trees were planted anywhere and anyhow, allowed to grow as they choose—like too many of our colonial youths are—until they got in the way of some one, then they had to get a pruning, which, instead of conducting to their wellbeing or fruitfulness, only caused canker and decay, and as weakness is the most susceptible to disease we may thank the past treatment of our old orchards and vineyards for a goodly amount of the trouble now. The different systems of training now are just about the opposite of what I have told you. The trees are now, instead of open centered, grown close, and some I have seen as thick as a boxthorn hedge; while instead of allowing the trees to fully develop their wood, an almost constant pruning goes on with the object of developing fruit spurs and having a full crop of fruit in three or four years. People nowadays do not care to wait so long for returns. But I do not think there will be much left for their successors. Farmers know what it means to allow stock to increase when too young. I believe in and cultivate the moderately full-branched tree, because it shelters the fruit from storms and sun. But I do not advocate the summer pruning of trees as distinct from disbudding or pinching, because any untimely cutting must be conducive to disease—that is, if the parts cut are only in the cellular state—and I know some now wish they had never tried the system. To me it is plain that if the young growths are cut while in the cellular state or before they become fibre, there cannot be a healthy tree built up under such treatment. Better wait a year or two for a return than cut your trees down before they are aged. A more severe pruning at the proper season will develop the fruit buds right along from the buds to the tips of the branches without any extra artificial modes at all. It will also serve to give your trees a stronger hold on the ground, and it produces the small fibrous roots which in turn produces the fruit spurs, flower, and fruit. If in the hurry to get a big tree on good land it is allowed to increase at the rate of 18in. or 2ft. per year and in width proportionately it develops larger roots, which go to make the wood, with perhaps a large fruit here and there inferior in quality, and in ten or twelve years the tree is run out. Then it is too late to cultivate fibrous roots and the trees are either cut down or allowed to remain and cultivate disease for posterity. In conclusion, I would recommend for general

purposes the close-headed bush form of apple tree, as it gives good crops of good fruit and need not be allowed to run so as to require a step-ladder to gather in the crop. For pears the horizontal system might by some be tried. It gives no shade to anything, takes up no room as it were, and produces large crops of large fruit. It is a good system for shy bearers, and if at any time they become infested with disease are easily sprayed or washed. I have referred only to the apple and pear, as on this occasion there is not time to mention apricots, peaches, &c.

Mr. WEDD said that trees should be planted the same depth as they were grown in the nursery. If Mr. Johnstone's system of training was followed the fruit would be much better.

Mr. R. CAMPBELL believed in keeping the soil around the trees well stirred.

Mr. JOHNSTONE said that every planter should be guided by the soil in which he was working for determining the depth he should plant. Given situation and soil suitable, he preferred planting trees on top of the ground and placing a mound around them, for fruit was produced from the humus obtained on the surface.

Mr. QUINN considered that the paper was a good guide for fruitgrowers. He did not know what Mr. Johnstone meant by horizontal pruning. It was generally safe to plant to the depth of the soil mark on the tree, but they might plant an inch higher or lower, according to the soil they were working. The statement that the humus, operating on the small or surface roots, supplied the fruit was one which could not be demonstrated, and he had never seen a scientific explanation of it. When visiting the Penola Fruit Colony he had noticed some trees too dense and thick in the middle, which had the effect of choking or killing the fruit; but this could be easily remedied.

Mr. JOHNSTONE then gave an illustration upon the blackboard of horizontal pruning, as follows:—"When starting fruit put three upright sticks in the ground an equal distance apart. Then place three or four rods upon them horizontally about 15in. apart. Plant the tree at the centre stick. If the tree has one leader and two side shoots, lead one to the right and one to the left and carry the next one to the next cross rod; prune it back at one eye above the rod, which produces one leader and two branches; one branch leads to the right and the other to the left. Train the centre to the next rod, and so on, as high as thought fit."

Mr. QUINN recognised the system as familiar to him, but he did not know it by the term Mr. Johnstone had designated it. He had peaches growing in that manner, and an advantage of it was that the trees could be pruned more quickly and readily, and produced better and earlier fruit than the standard trees.

Next Conference.

It was unanimously decided that the conference next year be held at Lucindale. A vote of thanks was accorded to the members of the Naracoorte Branch for the very complete arrangements they had made for the conference, and to the ladies of the district for the refreshments provided for the visitors.

Orchard and Vineyard Cultivation.

The evening session was taken up by addresses by Mr. George Quinn, Inspector of Fruit, and Professor Perkins on these subjects.

Mr. Quinn said before entering upon his subject he desired to make a few remarks upon Mr. Johnstone's paper. Since the paper was read he had the pleasure of seeing in Mr. Johnstone's garden the principle he had laid down about pruning and cultivating fruit trees clearly demonstrated. His garden showed that he could grow fruit trees as well as write a good paper about them. Concerning the exhibits in the hall that day, Mr. Quinn said that he had not seen fruit of a better quality previously. Particularly was this the case with the apples and pears. He was pleased to see such interest taken in fruit cultivation in the district.

Mr. Quinn then went into his subject, which he divided into three parts, viz. :—(1) Cultivation by way of preparation for fruit trees ; (2) winter cultivation ; and (3) summer cultivation. He dwelt at some length on how an orchard should be prepared for fruit trees, and impressed upon his audience that there was much loss and disappointment in fruitgrowing by careless preparation of the ground for receiving the trees. He specified the manner in which various soils should be treated, and he strongly advised drainage of the ground and the frequent stirring of the surface to allow the rain to penetrate the soil, and the air to circulate. He believed in deep cultivation on the surface, and if the ground was properly prepared there was no fear of the surface roots being injured. The land should be ploughed as early as possible to get the benefit of the winter rains.

Professor PERKINS, the Government Viticulturist, then spoke on "Vine Cultivation." He dealt briefly with the treatment of the ground. Deep cultivation was necessary, with the object of getting as much moisture as possible, and this was necessary during the winter months, so as to store as much water in the soil as could be obtained. The prevalent idea of a well-cultivated vineyard was an even surface made into a good seed bed ; but they could never make the best use of the rain that fell under such circumstances. He believed in the soil being in a rough state, to let the rain get into it, and the air circulate through it. He advised ploughing early in the year, to be followed by a second ploughing later in the year, and that there was no use scarifying. He invariably practised the views he had given expression to in the vineyard of 100 acres at Roseworthy Agricultural College, and he found the rough treatment of the ground preferable to a smooth surface. It was absolutely necessary in such a dry climate as they had in parts of South Australia to give every opportunity for the rain percolating to the subsoil. The Professor then referred to some criticism passed upon the Roseworthy College orchard by one of the members of the Naracoorte Branch who had visited the place, at one of their meetings. The following extract had appeared in one of the reports of the Branch :—"The orchard, under Professor Perkins, looked neglected. Prunings of trees were lying about, and the ground was in bad order and showed bad cultivation, which was more like pig rooting. It was nothing to compare with the Penola Fruit Colony for cultivation." This was not fair criticism. No doubt this visitor was commenting on the rough surface of the ground, which had been purposely left that way, and if he had taken the trouble to ask for an explanation, he would have received a satisfactory one. He would never have an orchard worked down fine during the winter—it was against his principles—and they could not expect an orchard of 100 acres, with the limited supply of labor they had at command, to be always in show order. They preferred visitors to see their work as it was ordinarily done.

Votes of thanks to those who had taken part and to the Chairman closed the proceedings.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, APRIL 19.

Present—Hon. A. W. Sandford (in chair), Messrs. Samuel Goode, W. C. Grasby, M. Holtze, T. B. Robson, and A. Molineux (Secretary).

Congress.

It was decided that the Eleventh Annual Congress of the Bureau be held in Adelaide during September Show week.

Horticultural Instructor.

It was decided to call the attention of the Minister of Agriculture to resolution carried unanimously at the Congress of the Bureau, in September last, asking that arrangements should be made to utilise the services of the Inspector of Fruit, Mr. Geo. Quinn, as Horticultural Instructor, and to relieve him of some part of his work inspecting fruit in Adelaide, so that his services might be more largely utilised in fruit-growing districts. It was resolved that, in the opinion of the Central Bureau, this resolution should be given effect to, and that Mr. Quinn should be appointed Horticultural Instructor.

Importation of Plants.

Mr. HOLTZE called attention to the rapid spread of phylloxera in Victoria, and to the great danger existing, under present conditions, of introducing the pest into this colony with plants from Victoria. He thought immediate steps should be taken to prevent the introduction of any plants unless accompanied by a sworn declaration that they had not been grown near any vines, and were free from any pest. He showed certificate required by Cape Colony Department of Agriculture, and thought we should adopt something similar.

Members agreed with Mr. Holtze as to the serious risks we run, and to the necessity for doing everything possible to keep out the pest, even at some expense and inconvenience to importers. The Secretary said he believed the Inspector of Fruit has already recommended that all plants introduced into this colony should be fumigated. After further discussion, it was resolved to recommend—

(a) That all plants, or portions thereof, introduced into South Australia should be subjected to fumigation by an officer of the Department of Agriculture.

(b) That a certificate, similar to that adopted in Cape Colony, be required with every parcel of plants introduced into the colony.

(c) That Customs officers inspecting travellers' luggage, &c., be required to ask travellers whether they have any plants, or portions thereof, with them.

Extracts and Translations.

The CHAIRMAN (Mr. F. E. H. W. Krichauff) forwarded the following extracts and translations from Foreign Agronomical Papers:—

289. *Best Time to Fell Timber.*—Trials made in Germany have led to the conclusion that the best timber is obtained from trees felled when circulation has stopped, at the end of autumn. Four pines of equal age and size, and grown on similar soil, were cut respectively at the end of December, end of January, end of February, and end of March. Beams cut from them of equal length and thickness were then put upon props at each end and weighted. The respective weights borne were as 100 for December, 88 for January, 80 for February, and 62 for March. Posts were thereupon put into the ground, and again those from pine cut in December remained sound, even after sixteen years, while the others could be broken much earlier, some in three or four years. The same trials were made with oak, and results were similar. I have had redgum posts, split after harvest, in the ground fully forty years, and those between the centre and those near the bark are yet sound, although brittle.

290. *Depth of Sowing Seeds.*—Professor Wolny recommends the following as the outside depths:—For wheat, rye, barley, oats, from 1 in. to 2½ in.; for millet, from ½ in. to 1½ in.; for maize, from 1 in. to 2 in. If the plants germinate from a greater depth they are more likely to be attacked by fungoid diseases.

291. *Green Manuring.*—Doherrain desired to ascertain whether grasses and other plants growing after harvest would, by decomposition in the soil, produce much nitrate quickly. He used lucern and vetches against rye grass, and found the proportion of nitrogen in unmanured soil to be 141.6, in that with rye grass 190.8, and in that with lucern 289.4. In moist years manuring with vetches or other legumens will add as much nitrogen to an acre as 12,000 lbs. of farmyard dung.

292. *Water in Butter.*—At Kiel 101 experiments were made to ascertain what influence a temperature and longer churning after the butter appeared might have. With a temperature

of 10° to 16° C., the butter contained on an average 11.07 per cent. of water. With a higher temperature and five minutes more churning, the average increased to 13.73 per cent., or more than 2½ per cent. more water.

293. *Value of Gypsum as a Fertiliser.*—Gypsum can supply only two ingredients of plant-food to the soil, viz., lime and sulphuric acid, and these can only be useful where they are otherwise deficient in the soil. Lime is almost everywhere abundant in the soil of arid climates, and the small quantity of sulphuric acid needed is also probably in most soils. Gypsum may be found efficacious for all pea-flowering plants, by setting free insoluble supplies of potash in the soil, and is good for preservation of carbonate of ammonia in manure.

294. *Selection of Potatoes.*—Dr. Sempotowski selected a few bags of potatoes from plants that had at least fifteen good-sized tubers. These were planted on one plot, while next to it another plot was planted with not so selected tubers. Result—585lbs. more tubers per acre from the first plot. On other plots he tried Bordeaux mixture against plots not so treated. In the first case he found 1½ per cent. of diseased potatoes, while the plots treated with sulphate of iron and lime, or not at all, had respectively 12½ per cent. and 15½ per cent. There is no doubt that the fewer the number of eyes the smaller the number of stalks, and the larger the tubers. It should be the aim of growers to raise varieties with only few lateral eyes.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Davenport, Mr. H. R. Randell; Gladstone, Messrs. D. Gordon and C. R. Phillis; Hartley, Mr. A. Jaensch; Penola, Mr. R. Fowler; Redhill, Mr. W. Stone; Bowhill, Messrs. Alb. Groth and Alb. Dohnt; Belair, Messrs. C. Downer and J. Halstead; Yankalilla, Messrs. J. Crawford, Jas. Malthouse, and A. Mayfield; Mount Remarkable, Mr. T. S. Bishop; Paskeville, Messrs. O. Grady and C. Koch; Port Lincoln, Dr. Kinmont and Mr. R. Sullivan; Naracoorte, Messrs. E. A. Wittber and B. S. Roach; Brinkworth, Mr. Alex. Crawford; Golden Grove, Messrs. A. Marr and R. Smith; Meningie, Messrs. H. May, W. Yates, and D. Roberts; Willunga, Mr. J. A. Hughes; Lipson, Mr. G. Carr; Albert, Messrs. R. Morton and W. Farley; Appila-Yarrowie, Mr. E. Catford; Holder, Mr. H. Vaughan; Mount Compass, Messrs. A. Sweetman and J. Jenkins.

Reports by Branches.

The Secretary reported receipt, since previous meeting, of eighty-eight reports of Branch meetings.

REPORTS BY BRANCHES.

Craddock, March 25.

Present—Messrs. R. Ruddock (Chairman), P. Gillick, T. Fitzgerald, B. Garnett, J. Paterson, J. H. Iredell, and J. H. Lindo (Hon. Sec.).

SEEDING.—The Chairman read a paper on dry and wet sowing, to the following effect:—

During a period of twenty years only once had there been sufficient rain to produce a crop equal to the capabilities of the land in this district. In all other years the crop had suffered more or less from deficient rainfall at some stage of its growth. It was therefore necessary for them to do all they could to make the most of what rain fell. In his opinion there was no better way than working as much land as possible in a wet condition, especially at seeding, as the plants come through much quicker than if it has a hard crust above it, as is generally the case with dry seeding. The ground also retains the moisture better if the surface is loose, and does not set so hard after future rains when worked damp. He was aware that there were difficulties in the way of putting in a sufficient area while the ground is wet, and, to make the best of things, he believed that they should give one stroke with the harrows after sowing on dry land, running the harrows over it again immediately after the first rains. He believed in running sheep over the crop immediately after rain if the wheat is high enough to entice the sheep to travel. He had had splendid results from this practice on land that had previously blighted very badly in dry weather, in September and October. The farmers in the North would also have to do more of their fallowing in the winter; they generally waited until the grass made some growth before commencing, and this often meant the work was barely started

before September; consequently they missed the winter rains, and the land was dry most of the time it was fallow. He believed this was the chief reason why the stubble crops were so often equal to those on the so-called fallow. He admitted he had been equally to blame with others in these matters, but there was no doubt that they would have to considerably alter the system under which they had been working.

Mr. Garnett fully agreed with the Chairman, and Mr. Fitzgerald also favored. Mr. Gillick said he saw the new patent disc plough at work in Adelaide during show week, and was favorably impressed with it. Mr. Fitzgerald in discussing the question of plump v. shrivelled seed said he had seen 25 bush per acre taken from a crop where shrivelled grain had been sown. Mr. Gillick had got better returns from shrivelled seed than from plump seed sown at same time on same kind of land. The general opinion of members was that the greater number of seeds gave the balance in favor of shrivelled seed, but the larger grain supported the plant better in dry periods of germination.

BAGS AS WHEAT.—Mr. Fitzgerald initiated discussion on practice adopted by wheat merchants of paying for bags as wheat. He considered that the merchants should pay for the bags. Mr. Garnett thought what was lost one way was gained in another. The Chairman and Mr. Gillick did not see what use it was discussing the matter as the present system was sure to be adhered to.

Renmark, March 23.

Present.—Messrs. W. Moffatt (Chairman), T. S. Wyllie, R. Kelly, J. L. Gubbins, R. V. Bostock, W. H. Harrison, E. Taylor (Hon. Sec.), and one visitor.

TOMATOES.—Members desired to know whether sulphate of ammonia would be beneficial or otherwise to tomato plants, and could it be used in conjunction with phosphates. [Yes. For an acre of tomatoes use 1,200 lbs. of fertilisers, containing 7 per cent. of soluble phosphoric acid, 6 per cent. of potash, and 4 per cent. of nitrogen. Sulphate of ammonia should contain about 25 per cent. ammonia; sulphate of potash, about 50 per cent. potash; and mineral superphosphate, about 16 per cent. phos. acid.—GEN. SEC.]

PRES.—Mr. R. Kelly read an interesting paper advocating pigs as a by-product for orchardists. He thought settlers could at least raise enough pork for home use at a very moderate cost by using up the windfalls, culls, and surplus vegetables in feeding the pigs.

Mannum, March 30.

Present.—Messrs. A. O. F. Faehrmann (Chairman), J. A. Schulze, F. W. Kowald, R. Heidrick, B. Baseby, C. Pfeiffer, J. W. Walker, J. Nickels, and H. Brown (Hon. Sec.).

LUPIN SEEDS.—Mr. J. G. Preiss sent for distribution a bag of lupin seeds, which are used as a green manure for enriching sandy land, and, to some extent, as a preventive of drifting sand.

CO-OPERATION.—Mr. J. A. Schulze read a paper on this subject, to the following effect:—

It is not only necessary for agronomists to find ways and means to increase the productiveness of the soil and quality of the produce, but also to get it to market in the cheapest way and sell at the highest price. Producers should ask Government to carry on railway all products for export at a low rate, to place the inland producer on an equality with his more favorably situated fellows near the seaport. To get the highest prices it will be necessary for all producers to co-operate and send the surplus of their crops direct to the world's market,

and save the high charges of the middlemen. The establishment of the South Australian Farmers' Co-operative Union was a step to the right direction, and it should be supported by all farmers, so as to enable the union to export all products, as well as to import all farming implements, manures, cornsacks, and other requisites of the farm. Farmers are at present paying for American harvesting machines over 150 per cent. more than they cost at the factory, and it is probably the same with thrashing machines, clippers, horsesakes, seed drills, cream separators, and other things which the farmer must have. In time, if supported by all farmers, the union would establish factories and construct strippers, ploughs, scarifiers, harrows, wagons, carts, and all other necessary farming implements, and thus reduce the cost of such articles to at least half present prices. In large farming districts such as Mannum there should also be a co operative store to receive the dairy produce, and in connection with a creamery or a butter and cheese factory. By joining the Farmers' Co-operative Union the position of the farmers and other agronomists would be very greatly improved.

Redhill, March 27.

Present—Messrs. S. H. Treloar (Chairman), D. Steele, R. Siviour, D. Lithgow, G. Wheaton, F. Wheaton, R. S. Nicholls, A. A. Robertson, and T. McDonald (Hon. Sec.).

DRILLING MANURES WITH SEED.—Mr. G. Wheaton said that three years ago they tried drilling seed and fertilisers together, with satisfactory results. Since then they have increased the area each season, and in every case the results have been considerably better than when fertilisers have not been used. Mr. D. Steele had similar experiences to record; but Mr. Nicholls had tried Kangaroo guano last year and failed. He thought he had sown the seed too deeply, and that he had got an inferior sample of guano. The Chairman tried Kangaroo guano on stubble land, in the hope of getting a second year crop, but the result was unsatisfactory. The crop came away well, but later on became badly affected with black rust. Some of the manure was like sea sand, and gave very little crop; other bags contained dark-colored stuff, and this gave a bag more of wheat per acre.

Crystal Brook, March 25.

Present—Messrs. G. Davidson (Chairman), W. J. Venning, J. C. Symons, W. Nott, M. Weston, and George Miell (Hon. Sec.).

HISTORY OF AGRICULTURE.—Mr. W. J. Venning occupied the evening in reading a very interesting article from an English newspaper, giving some particulars about agriculture from the earliest days of history up to the present time.

Mundoora, March 27.

Present—Messrs. R. Harris (Chairman), J. Blake, G. Haines, J. J. Vanstone, W. J. Shearer, and A. E. Gardiner (Hon. Sec.).

BEST VARIETIES OF WHEAT.—*Re* best three varieties of wheat for this district, with regard to prolongation of harvest and profitable results, Mr. Blake, after many years of experimenting, finds it more profitable to grow the early sorts. The spring, which often sets in dry, often brings a severe check upon the later varieties; but some seasons have been more favorable, and then the later kinds made better growth and gave heavier yields. He recommended, first, Early Para and Steinwedel; second, Purple Straw; and Red Straw has also given good results. Mr. G. Haines always got best results from Steinwedel, Pride of Barossa, and Red Straw. Pride of Barossa grows fast, has good straw, does not go down nor shake out. Mr. Vanstone favored early Para and Steinwedel, but harvesting must be started early and completed quickly, else

Steinwedel will shatter out and Early Para lie down. Mr. Shearer, as a wheat-buyer's agent, found the best samples for stripping were Early Para, Bearded, and Purple Straw, and many farmers had told him that those wheats gave best results.

INFERIOR BLUESTONE.—A long discussion took place upon this subject. It appears that there is a pale blue chemical, generally sold under the name of "colonial" bluestone, which is soft and of little or no value for pickling seed wheat. Crops raised from seed that has been pickled with this rubbish almost invariably prove to be bunted. One member thought that the use of hot water for dissolving the bluestone is injurious. [But in this he is mistaken.—GEN. SEC.] The bluestone sold as "English" imported was dark blue, and very good. [Farmers should be very careful to note that bluestone is hard, crystalline, and deep brilliant blue in color. The cheap soft greenish or whitish substance sold by some storekeepers is not "bluestone," but is copperas or greenstone, and is of no use for pickling seed wheat.—GEN. SEC.] Mr. A. E. Gardiner said he was sorry to say that sulphate of iron (copperas or greenstone) was often sold under the name of bluestone, and equally sorry to find that many people concluded that, because it was so useless, therefore it must be "colonial." It was more likely that it is imported, because we have plenty of copper in South Australia, and sulphate of copper is made at the Wallaroo Smelting Works quite equal to any imported. His brother and himself had used Wallaroo bluestone for three years past, and found it all that could be desired. Part of last year's supply remains on hand, and is quite as solid and good as when supplied. Members thought that steps should be taken to prevent the fraudulent substitution of adulterated bluestone, or of sulphate of iron for sulphate of copper.

Golden Grove, March 30.

Present—Messrs. T. McPharlin (Chairman), J. R. Smart, S. A. Milne, J. Murphy, J. Ross, and A. Harper (Hon. Sec.).

FARMERS' RELIEF FUND.—Members present were not disposed to sympathise with suggestion to form a permanent fund for relief of distressed farmers. It was decided to consider the matter further at next meeting.

Meadows, April 3.

Present—Messrs. J. Catt (Chairman), W. Pearson, T. B. Brooks, W. J. Stone, T. A. Buttery, G. Rice, W. A. Sunman (Hon. Sec.), and two visitors.

FARMERS' RELIEF FUND.—Members were of opinion that it would be better to purchase land in districts better situated as regards rainfall than to continually maintain people on land where the climate is altogether unsuitable for farming.

"BLANKET WEED."—This is the name given locally to the Toad Flax (*Linaria elatine*), which is spreading extensively in the district, and is causing some anxiety. It was thought that it might be kept in check by pulling and burning.

TYMPANITIS.—Mr. Pearson wished to learn if there is any quicker remedy than a tablespoonful of carbonate of soda in a wine bottle of water to relieve bloat in cattle, caused by eating lucern. He was informed that lucern should be cut and left to wilt for a few hours before being given to cattle. This will also prevent any bad odor or flavor in the milk.

HEMP.—Mr. Rice tabled some hemp plants. He found much difficulty in protecting the seed from sparrows.

SEASON.—During the past three weeks about 3in. of rain have fallen, and the season has been very favorable.

Morgan, March 25.

Present—Messrs. J. Jackman (Chairman), A. Stubing, L. Stubing, R. Windenbank, and J. Wishart (Hon. Sec.).

MEETINGS.—The Hon. Secretary reported on failure of members to attend previous meetings. After some discussion it was resolved to make a further effort to carry on the Branch, the members present pledging themselves to attend regularly. It was decided to strike off the roll any members failing to attend for three consecutive meetings.

FARMERS' RELIEF FUND.—A resolution was carried supporting this proposal, and it was decided to assist as far as possible.

Forster, March 27.

Present—Messrs. A. Johns (Chairman), J. Johns, F. Johns, J. A. E. Schenscher, F. Towill, J. R. Bolt, W. H. Bennett, J. Sears, J. Retallack, and J. D. Prosser (Hon. Sec.).

PLOUGHING AND SOWING.—Members agreed that from 2in. to 2½in. is the best depth to plough on light soils, and that the seed may be ploughed under to that depth. On heavy land, where sandalwood grows naturally, the depth may be 4in. to 5in.

RAINFALL.—For February, 1·35in.; for March, 0·32in.

PHOSPHORUS POISONING.—In answer to an inquiry, members were informed that no certain remedy is known; but emetics should be administered, and calcined magnesia given freely.

Lipson, April 1.

Present—Messrs. G. Provis (in chair), J. Brown, Chas. Provis, Jas. McCullum, H. Gale, W. F. Darling, E. J. Barraud (Hon. Sec.), and two visitors.

BAGS AS WHEAT.—The Chairman initiated a discussion on this subject. He stated that the millers were not only paying for bags as wheat, causing a loss of 3½d. on every bag sold by the farmer, but were deducting 2d. per bag on so-called second-hand bags, making the loss to the farmer still heavier. The Hon. Secretary called attention to Prof. Lowrie's notes on the standard bushel. He agreed with the professor that it would be better to have one standard for first-class samples and one for fair average quality. It would, he believed, be the means of farmers with good samples of grain getting a better price for their wheat. Some members thought that it would only result in the buyers getting a better sample without paying any extra price for it.

Port Pirie, March 23.

Present—Messrs. P. J. Spain (Chairman), G. Robertson, F. Gambrell, A. Wilson, W. Smith, H. B. Welch, and R. J. Ferry (Hon. Sec.).

BEST WHEATS FOR DISTRICT.—Mr. Wilson said early sorts should be grown. King's Early Solid Straw did fairly well, but was not considered a good milling wheat. When trying new varieties the test should be continued for several years, as some kinds required four or five seasons to develop their capabilities. Pride of Barossa had not received a fair trial. Other members did not receive this suggestion with favor. The Chairman had good results with Carmichael's Eclipse, Baroota Wonder, and Smart's. The first he considered really good, and well adapted to the district, as it is rust-resistant, early,

plump, weighs well, yields well, and a good milling wheat, but does not make good hay. Baroota Wonder resembles Tuscan, is fairly early, shakes out somewhat, good sample, of good milling quality, makes good hay. Smart's is early, is like Steinwedel, is liable to rust, and should be sown early. King's Solid Straw was successfully tried last year; it stands well, does not shake out, makes first-class hay, but holds it beard. If seasons were wet he would sow Budd's and Ward's. The various members proposed to sow this season Carmichael's Eclipse, Baroota Wonder, Smart's, Gluyas, King's Solid Straw, Early Para, No. 1 Beardy. It was suggested that the Agent-General for South Australia should be requested to procure sweepings from the holds of wheat-laden ships from all parts of the world, to be distributed amongst the Branches of the Bureau for experiment. [A grand chance for introduction of Hessian fly and a hundred pests and diseases.—GEN. SEC.]

Richman's Creek, March 28.

Present—Messrs. W. Freebairn (Chairman), A. Knauerhase, P. J. O'Donoghue, W. Rodgers, J. J. Scarle, F. Mattnr, A. Nicholson, W. J. Wright, J. McSkimming, E. Roberts, J. J. Gebert, M. Hender, J. McColl (Hon. Sec.), and two visitors.

ADELAIDE SHOW.—Chairman had seen very little of interest in the shape of machinery at the show. A three-furrow disc plough in work went through hard soil very well.

SEED AND FERTILISER DRILLS.—It was decided to procure 5cwts. English super. for experiment if a seed drill can be available for this locality.

PERMANENT DROUGHT FUND.—Members approved of this movement, but are not in a position to aid owing to late severe drought. They suggested that assistance be available only to subscribers, and only as a loan, except in special cases arising from unavoidable causes other than drought. That all applications should go through a local committee and be subject to their approval.

Woodside, March 13.

Present—Messrs. R. Caldwell, M.P. (Chairman), C. W. Fowler, F. Heidrich, N. Schröder, J. C. Pfeiffer, R. W. Kleinschmidt, A. Pfeiffer, E. Esau, and G. F. Lauterbach (Hon. Sec.).

PERMANENT DROUGHT FUND.—Sufficient information as to the regulations under which the proposed fund is to be controlled not being available at present, this Branch is not in favor of taking the matter in hand.

HOMESTEAD MEETING.—This meeting was holden at the farm of Mr. N. Schröder, and members were provided with afternoon tea by Mrs. Schröder.

DAIRYING.—Mr. J. C. Pfeiffer considers great judgment is necessary in stocking a dairy farm. If over stocked, losses are sure to result. Neglected cows will become poor and give only a small quantity of inferior milk. Much care must be devoted to the selection of cows suitable to the pasture and climate. For this locality strong healthy cows should be kept—such as Short-horns or Holsteins. Alderneys and cows of that class are too delicate for this part of the colony. It is very important that cows should be milked quickly and gently. He would stable cows all the year round, but for the interference of the Local Board of Health and Inspector of Water District. He considered the most profitable time for cows to calve is in January, when they are in good condition after the spring and summer fodder. The price of butter is then good. His cows each averaged 300lbs. butter per year. Calves dropped in

July are best to rear, and it is best to rear them by hand during the three following months, until the green feed comes on, when they will thrive for the rest of the season, and should make strong healthy cows. All members thought 300lbs. butter per cow per year was exceptionally high. If all dairymen regulated the calving for January it is probable prices of butter would decline.

Pine Forest, March 28.

Present—Messrs. W. H. Jottner (Chairman), E. Masters, J. Flowers, A. Inkster, A. Mudge, J. Phillis, R. Barr (Hon. Sec.), and one visitor.

CONFERENCE OF BRANCHES AT BUTE.—Members regretted that this Conference had been called during seeding time, but decided to attend. The following questions were submitted for consideration:—"Best way to treat land in order to obtain a consecutive wheat crop from a field that was drilled with manure last season," "Analysis of manures," and "The bag question." As the Conference is fixed for April 26, it was resolved to forego the Branch meeting for same day.

BEST THREE WHEATS FOR DISTRICT.—Although Steinwedel shakes out, breaks down badly in the straw, is susceptible to bunt and red rust if late crop, yet its earliness, quick growth, good milling quality, and heavy yields—all proved by years of experience—entitle this variety to be placed first. Red Straw occupies second place; but with regard to third position opinions are divided between Dart's Imperial, Rattling Jack, and Purple Straw. The early-maturing wheats are decidedly best for this district, and King's Early, African Baart, and Hawke's Club would probably come into favor on that account, provided no special bad qualities could be urged against them.

POULTRY.—Mr. Inkster said it is unsafe to keep more than 100 head in one flock, because disease of some sort is sure to occur amongst them. He had known several cases of failure where the number was increased to 150 or 200. Mr. Flowers advocated change of settings of eggs and a fresh rooster occasionally to prevent disease. The Chairman said in order to have winter eggs chickens should be raised all the year round. He considered South Australia an ideal country for poultry-raising. Members consider the choice show breeds are most susceptible to all kinds of disease. Owing to, perhaps, want of system in feeding and general good management in many cases, a wide divergence appeared to exist with regard to the cost of keep and profits derivable from poultry, but it was unanimously agreed that it will pay to feed fowls on clean wheat when the market price is under 3s. per bushel.

Albert, April 8.

Present—Messrs. J. Wetherall (Chairman), A. B. Struther, W. Napper, R. C. Rasmussen, W. H. Clarke, T. Cooper, H. L. Smith (Hon. Sec.), and four visitors.

FARMERS' RELIEF FUND.—Members promised to do all they could to help this matter on.

PIG-BREEDING.—Mr. Cooper asked what was the best kind of sow to mate with a Berkshire boar for general purposes. Mr. Clarke said any good, long, roomy sow other than a Berkshire would be suitable. The Berkshire kept too fat and did not, with him, produce good litters.

RAINFALL.—For three months, 2'88in.

Kadina, April 6.

Present—Messrs. T. M. Rendell (Chairman), James Martin, H. Johnson, Peter Roach, G. E. Putland, and J. W. Taylor (Hon. Sec.).

CONFERENCE.—Mr. Roach promised to attend and read paper at Port Broughton Conference on April 26.

EXHIBITS.—Mr. Putland tabled samples of early varieties of wheat.

Gawler River, March 24.

Present—Messrs. A. M. Dawkins (Chairman), D. Humphries, G. Johnston, F. P. Parker, J. Hillier, J. Badman, A. Bray, R. Badcock, H. Roberts, H. Heaslip, and H. Roediger (Hon. Sec.).

FERTILISER EXPERIMENTS.—At the request of Mr. F. H. Snow, the Hon. Secretary undertook to carry out experiments with Thomas phosphate, nitrate of soda, and potassic manure.

SUMMER RAINS.—A discussion took place on the beneficial and injurious effects of the heavy rain in February. It was agreed that the rain did good in starting seeds of weeds to grow early, thus enabling the land to be cleared before sowing; also, the grass having started would, with favorable weather, now give good early feed. It was also thought that, the ground being moist while warm, plant food in the soil would be changed from an insoluble condition to a form in which it would be more readily available for the plants. On the other hand, the rain spoilt much dry feed, upon which stock now depend, making it gritty, and unless rain comes again soon the young feed started by the rain will die off.

Appila-Yarrowie, March 24.

Present—Messrs J. Wilsdon (Chairman), P. Lawson, J. C. W. Keller, A. Fox, C. W. H. Hirsch, J. M. Grant, J. H. Bottrall, J. O'Connell, W. C. Francis, J. H. Klemm, C. G. F. Bauer (Hon. Sec.), and three visitors.

GLADSTONE CONFERENCE.—The Chairman, Mr. C. W. H. Hirsch, and the Hon. Secretary reported on the proceedings of the recent Conference at Gladstone.

FARMERS' RELIEF FUND.—This subject was discussed, members favoring voluntary subscriptions to the fund, as if each farmer were to give a little each year the fund would soon amount to a substantial sum.

BOILED V. CRUSHED WHEAT FOR FEEDING.—Mr. Bottrall initiated a discussion on this subject. Considerable difference of opinion existed as to whether boiled wheat was better than crushed wheat as feed for horses.

PAPER.—Mr. Fox read a paper descriptive of what he saw on a recent visit to Queensland.

Johnsburg, April 1.

Present—Messrs. T. W. Hombsch (Chairman), L. Chalmers, J. Sparks, T. Thomas, H. Arnold, W. McRitchie, and T. Johnson (Hon. Sec.).

STANDARD SAMPLE OF WHEAT.—Considerable discussion took place on a paper by the Chairman upon the question of how the average weight of a bushel of the whole wheat product of the colony for each season should be arrived at. It was agreed that a higher price ought to be paid for wheat weighing above the standard of average, and that it would be advantageous if two or even three grades were fixed, with proportionately ascending values per bushel for samples rising in weight above the lowest grade. This would incite

farmers to take more care in cleaning their wheat, and this would raise the character and value of the South Australian grain in home and foreign markets. The Chairman strongly advised all farmers to join the Farmers' Co-operative Union, and referred to several anomalies connected with gristing wheat at the flour mills.

Norton's Summit, March 18.

Present—Messrs. J. Jennings (Hon. Sec.), J. Pellew, J. Hank, and A. Smith.

FRUIT FLY.—The Chairman reported that, on behalf of the Branch, the Hon. Secretary and himself had written to the daily press *re* the danger of introducing the fruit fly from the other colonies. Action approved. The Chairman read article from *Leader* on experiments *re* temperatures for fruit.

Kapunda, April 1.

Present—Messrs. W. Flavel (Chairman), J. J. O'Sullivan, G. Teagle, J. O'Dea, T. Scott, W. M. Shannon, J. H. Pascoe, P. Kerin, H. King, J. A. Schultz, G. Harris, and T. Jeffs (Hon. Sec.).

CONFERENCE.—Hon. Secretary Eudunda Branch wrote, stating that Conference of Branches was postponed until September next. [Do not clash with Royal Agricultural Show or Congress in September.—GEN. SEC.]

BEST THREE WHEATS FOR DISTRICT.—Mr. O'Sullivan read a paper upon this subject, in which he referred to the varying soils, exposures or sheltered positions, and other conditions affecting the question, and whether wanted for hay or for grain. In his locality hay often ranked first in regard to profit. In some parts, sheltered from strong winds, Steinwedel found many advocates. For hay he preferred Scotch Wonder, Red Tuscan, and White Tuscan, as they are tall and weigh well. Early Para is a good hay wheat, but will not stand rough weather. For grain he would use Purple Straw and Red Tuscan, but all red straw wheats are good grain producers. To extend harvest time, farmers could sow Steinwedel and Early Para, and for later work sow Purple Straw, Tuscan, or White Lammas.

NEW WHEAT.—Mr. King tabled a newly-named wheat called King's Superior, which he thought would be a good milling variety.

Elbow Hill, March 28.

Present—Messrs. H. T. Styles (in chair), C. G. Ward, W. Beinke, W. Spence, J. Ellaway, H. Dunn, J. Rhen, C. L. DuBois, G. Wheeler (Hon. Sec.), and eight visitors.

WATER CONSERVATION.—A discussion took place on the advisableness of obtaining a general water supply for this locality. It was thought the Mindrow spring would supply all the water required, and it was decided to ask the Conservator of Water for estimate of cost, &c., of bringing water to the district. Mr. Ellaway thought if the Government loaned money to farmers for constructing tanks on their own land, on similar conditions as wire netting, it would settle the water difficulty.

SELLING BAGS AS WHEAT.—Mr. C. L. DuBois read a short paper, in which he claimed to know something about the question, as he had formerly been a wheat agent for a considerable time. With bags at 5s. 6d. per dozen, or 5½d. each, at present prices of wheat farmers still got a little the best of the transaction in having them weighed in as wheat. In his time he always quoted prices

for wheat in bags and wheat without bags, and there was always a difference of 1d. in favor of bags with wheat. Some who bought bags preferred to sell them weighed with the wheat; but those who borrowed bags really lost by selling net weight when wheat was at 4s. to 5s. per bushel. He thought that the dissatisfaction now felt in some quarters was due to the fact that no price was quoted for wheat without the bags. By the present system the price is fixed at 1d. per bushel more with bags than it would be without, or 4½d. per bag. Then the bag is weighed in as wheat, which, at present price, is ½d. per lb. The bag weighs 3lbs., which is equal to 1½d., a 5½d. total on each bag. Some bags are sold as low as 4s. 6d. per dozen, whilst others fetch as high as 5s. 6d. at the Harbor, so that the gain is proportionate to the price paid for bags. To prove that farmers were getting the full market value for their wheat, he quoted the Adelaide prices, because those prices ruled the rates at the outports, while local conditions very often rule local prices. The present price in Adelaide was 2s. 6d. per bushel, and in London 3s. 4½d., a difference of only 9½d. per bushel. Freight to London was 25s. per ton, or 8d. per bushel, commission and insurance 1½d. per bushel, so that these items take up the whole difference between Adelaide and London prices, and the exporting merchant has only the increase in weight during the voyage to rely upon for his profits. That gain is considerable. In a cargo shipped by a syndicate of farmers from Wallaroo the gain in weight nearly paid the freight, but the price of wheat then was 5s. per bushel. At the outports wheat is bought less freight to Adelaide, but is generally shipped direct from the outport, thus giving another source of profit to the shipper. In former times the difference in price between London and Adelaide markets was always from 11d. to 1s. per bushel (sometimes more), and that difference was then necessary, because most of the wheat was shipped from Adelaide, while now more is shipped direct from outports; consequently shippers can give higher prices at outports than they could formerly. Now the difference is only 9½d. between Adelaide and London prices, and farmers are not only getting the extra 1d. per bushel for wheat, and bags as wheat, but, in addition, the utmost farthing that the buyer can afford to give. Of course, at Franklin Harbor and some other places, less is sometimes offered than the difference between the locality and Port Adelaide, but in such cases the remedy lies in the hands of the farmer. Several members disagreed with the opinions expressed by Mr. DuBois.

STINKWORT.—Mr. Ellaway called attention to the hold this weed was obtaining in the district.

Boothby, March 28.

Present—Messrs. R. Chaplin (in chair), H. S. Robinson, T. Robinson, R. M. B. Whyte, M. Leonard, H. G. Evans, J. R. Way, and G. F. Way.

BUNT.—A discussion took place on bunt in wheat, and methods of prevention. Attention was directed to Professor Lowrie's notes on pickling seed, which was well discussed. Mr. Evans advised farmers to stop harrowing in light showery weather, as seed sown in such weather seemed very subject to bunt. The Chairman said wheat for seed should be allowed to ripen thoroughly before being harvested. Members generally were of opinion that 1oz. blue-stone to the bushel of seed was not sufficient in this district, 2ozs. being the quantity in general use.

REPAIRING WHEELS.—Mr. Evans explained an easy method repairing a cast wheel by re-boxing when the centre has worn too much, as frequently happens with their farm implements. He had boxed one with steel, and it was now as good as new for practical purposes.

Holder, April 8.

Present—Messrs. F. A. Grant (Chairman), J. Green, F. Slater, F. G. Rogers, E. Crocker, E. Trimming, J. J. Odgers (Hon. Sec.), and one visitor.

KAFFIR CORN.—Mr. Brougham reported that the Kaffir Corn sown last season was cut down and the roots allowed to remain in the soil. This season they had sprouted again, and thrown out more shoots than last season, while the corn produced was larger and better than from the previous season's seed. Pigs appeared to relish the stalks of Kaffir Corn. In reply to question, members considered September the best time to sow maize.

RAINFALL.—Recorded for year to date, 4'70in.

Mount Pleasant, April 14.

Present—Messrs. G. Phillis, H. A. Giles, R. Godfree, W. Vigar, J. F. Miller, J. Maxwell, J. A. Naismith, W. Lyddon, H. Drogemuller, and Rev. H. T. Hull (Hon. Sec.).

DROUGHT-DISTRESSED FARMERS' FUND.—It was the general opinion of the members that it is not advisable to form such a fund, as it simply encourages men to remain on land unfitted for agricultural purposes.

CEREALS.—An article on "Wheats and their Values," forwarded by Mr. R. T. Melrose, was read. It was decided to obtain twenty-one bags of seed oats from Tasmania for the members of the Branch.

Millicent, April 6.

Present—Messrs. R. Campbell (Chairman), A. McRostie, H. Oberlander, W. R. Forster, H. Stewart, H. F. Holzgreffe, H. Hart, and E. J. Harris (Hon. Sec.).

MANURES.—The Chairman reported that at the request of Mr. F. H. Snow he had undertaken to conduct certain experiments on wheat with manures to be supplied by that gentleman.

CONFERENCE.—Two members reported on proceedings of Naracoorte Conference in very favorable terms. A discussion ensued on district shows, members being of opinion that it would entail too much expense to hold a general show in the south-eastern townships alternately.

SHOW.—It was decided to hold an exhibition and social in connection with the Branch and the Ladies' Grange in June, and to invite the Inspector of Fruit and the Dairy Instructor to attend, and give instruction in their respective branches of agriculture.

VISIT TO HOMESTEAD.—This meeting was held at the residence of Mr. Hart, and, after the business of the meeting had been concluded, an inspection was made of the orchard, buildings, machinery, &c. A discussion arose on fruit trees and fruit pests, during which much information was given by different members.

Cherry Gardens, April 12.

Present—Messrs. R. Gibbins (Chairman), T. Jacobs, C. Lewis, J. Lewis, G. Mackereth, E. Wright, W. Nicolle, G. Nicolle, G. Hicks, G. Potter, G. Richards, J. Metcalf, C. Ricks (Hon. Sec.), and two visitors.

PERMANENT RELIEF FUND FOR DROUGHT-DISTRESSED FARMERS.—It was decided not to form any committee of the Branch in connection with this fund, as

it was considered to be a mistaken charity to try to keep farmers on land where there is so deficient a rainfall, whilst there is so much uncultivated land within the area of a good average yearly rainfall.

RABBITS.—Attention of district council of Clarendon to be directed to the large number of rabbits on the water reserve at Happy Valley.

BRANCH SHOW.—The late Show was an unqualified success, showed a profit of nearly £8, and is to be held annually on third Thursday in March.

Gladstone, April 8.

Present—Messrs. J. King (Chairman), J. Tonkin, J. Shephard, E. Coe, J. Gallasch, C. R. Phillis, J. Milne (Hon. Sec.), and one visitor.

NEW WHEAT.—The Chairman tabled sample of new wheat raised by himself. It was not unlike Ward's Prolific in appearance, but had a white grain, and was a very early variety. He saved and sowed the seed from one plant which produced ten heads, and from those he obtained 2bush. as a result.

TREE-PLANTING.—Mr. Coe promised a paper for next meeting on "Tree-planting for Shelter and Windbreaks."

Clare, April 14.

PRESENT—Messrs. W. S. Birks, W. Kimber, H. Carter, C. J. McCarthy, Jno. Radford, H. Miller, J. Treleaven, J. T. Hague (Hon. Sec.), and one visitor.

DISTRESSED FARMERS' RELIEF FUND.—This subject was well discussed, but the majority was against. The general opinion was that farmers should form relief funds for their own district.

CURCULIO BEETLE—Mr. Kimber reported that this pest had done great damage to his apple trees, having almost stripped them of all their leaves.

Yorke town, April 8.

Present—Messrs. J. Koth (Chairman), C. Domaschensz, Jno. Latty, and Jno. Davey (Hon. Sec.).

MANURES AND SEED DRILL.—Hon. Secretary had received from the Nantawarra Branch a report on the experience of some of its members on the results of their use of drills and the different fertilisers placed on the market. The best results were obtained from English super.

BEST WHEATS FOR DISTRICT.—There was a long discussion on this subject, the conclusion being that, to ripen first, Steinwedel and Early Para were best; and of the later sorts, Dart's Imperial and Purple Straw were preferred.

Mount Compass, April 8.

Present—Messrs. M. Jacobs (Chairman), S. Arthur, R. Cameron, A. J. Hancock, F. Slater, R. Peters, S. Lawrence, H. McKinlay (Hon. Sec.), and three visitors.

RABBITS.—Mr. Hancock reported that rabbits had been damaging his fruit trees by eating the bark. He tried the following remedy with very good results:—Dry fowl manure mixed with a little clay and water, and "painted" on the stems of the trees.

BLACK SPOT ON POTATOES.—Mr. Jacobs said he had sprayed his potatoes twice with Bordeaux mixture for this disease, but it took no effect. It is reported that this disease has spoiled a considerable amount of the late crops.

SEED POTATOES.—Members reported on the seed potatoes given to them for experiment as follows:—Hero, doing very well, promising to be a great success; Regius, Pluto, and Silesia, doing very well.

STRATHALBYN CONFERENCE.—Mr. Jacobs reported on this conference.

Auburn, April 20.

Present—Messrs. W. R. Klau (Chairman), E. M. Dudley, J. Ford, J. Hean, J. E. Isaacson, Dr. Yeatman (Hon. Sec.), and two visitors.

ZANTE CURRANTS.—Mr. Isaacson tabled samples of these currants, which were much admired. They were grown on four-year-old vines, and dried by Mr. G. Lambert.

FARMERS' PERMANENT RELIEF FUND.—Members thought the establishment of this fund not desirable, as the permanent nature of the scheme was alone sufficient to condemn it, and the difficulties in the way of making a fair distribution were almost insuperable. Members knew of instances where those who required most help had preferred to maintain their independence, and had not applied for relief. Members considered that if the cycle of good and bad seasons in the North continued to be so disproportionate that farmers could not obtain a living, they had better give up the struggle, and try elsewhere; but as to providing a permanent relief fund for them, it was out of the question.

Balaklava, April 8.

Present—Messrs. W. H. Sires (Chairman), C. L. Reuter, A. Manley, J. Mills, J. Vivian, E. Roberts, P. Anderson, A. Hillebrand, G. Reid, and E. M. Sage (Hon. Sec.).

MANURES.—The General Secretary reported that the sample of super forwarded for analysis showed on 1.26 per cent. of soluble phosphate. Considerable discussion took place on the value of this fertiliser (which contained a large percentage of phosphate of lime insoluble in water), and on the action of the makers in selling it as superphosphate.

FARMERS' PERMANENT RELIEF FUND.—After discussion, it was resolved that this Branch is not in favor of making the relief fund permanent, as all forms of charity tend to lower the status of those receiving same. It was considered that, instead of relief funds, more good would result from a large extension of the principles of co-operation, which should be achieved by the enlargement of the scope of the present Farmers' Co-operative Union, or the formation of fresh unions.

Morphett Vale, April 5.

Present—Messrs. L. F. Christie (Chairman), J. B. n, H. Anderson, F. Hutchinson, A. Pocock, J. Depledge, J. Spriggs, J. McLeod, T. Anderson, Alf. Perry, A. Ross Reid (Hon. Sec.), and two visitors.

COMPLAINT IN FOWLS.—The Hon. Secretary asked for a remedy for swollen and diseased heads in fowls. Mr. Pocock recommended sulphate of iron in the drinking water. Mr. Hutchinson advised blowing a little flowers of sulphur down the throat.

USE OF STABLE MANURE.—The Hon. Secretary initiated a discussion on the best method of utilising stable manure. He considers it is more profitable to place it on grass land than on cropped land, as the grass grown by it is returned to the land by the stock. The members considered that the manure should be well rotted before using, but Mr. Smith, a visitor, thought that it is more profitable to make use of it as soon as possible, to save loss of ammonia. A discussion ensued on the use of superphosphate.

FIELD TRIAL.—A field trial was held on Mr. W. Reynell's property on April 14. Messrs. Harrold, Colton, & Co. worked their disc harrow, also spring-tooth cultivator and peg-tooth harrow. The disc harrow was considered specially useful for breaking down rough fallows, and breaking up stubble to a shallow depth. The peg-tooth harrow was much admired, as it is as cheap as and has several improvements on the ordinary harrows. For summer work on the fallows the spring-tooth cultivator was considered very suitable.

Caltowie, March 6.

Present.—Messrs. G. Lehmann (Chairman), J. Neate, D. Wilson, L. Graham, J. Potter, A. McDonald, J. A. Leahy, P. O'Loughlin, G. Petatz, J. Noonan, and R. Walsh (Hon. Sec.).

GLADSTONE CONFERENCE.—Mr. McDonald reported on proceedings of conference held at Gladstone.

FLORIDA VELVET BEAN.—Two members reported that seeds of this plant germinated all right, and grew a little, and then died.

STALLION TAX.—Members were opposed to any tax being placed on entire horses.

INFERIOR BLUESTONE.—Mr. Leahy initiated a discussion on this subject, and thought the prevalence of bunt last season was largely due to use of inferior bluestone. Other members agreed, and it was resolved that in the opinion of the Branch it was advisable that the bluestone sold in the colony should be tested, as is done with fertilisers.

STANDARD BUSHEL.—A resolution was moved in favor of a higher standard for wheat, with payment for over standard samples proportionate to reduction made for samples under the standard.

Pyap, April 19.

Present.—Messrs. J. Holt (Chairman), W. Axon, J. Bowes, J. Harrington, T. Smith, E. Robinson, C. Billelt, G. Napier, H. Mills, J. F. Bankhead, and W. C. Rodgers (Hon. Sec.).

PERMANENT RELIEF FUND.—Pyap Village Association donated five bags of Velvet Pearl wheat to this fund. [All donations in kind to this fund should be realised at nearest market, and funds remitted to Mr. J. Creswell, Secretary to the fund, and *not* to the Bureau.—GEN. SEC.]

FLORIDA VELVET BEAN.—Mr. Axon reported these plants grown in sheltered position were doing well and podding freely.

POTATO PEST.—Members reported that the cockchafer grubs were in evidence again, and have been found burrowing under the skin of the potato setts after they have been in the ground a short time. The Hon. Secretary suggested dipping the setts before planting in some solution to prevent the grubs attacking them.

UNRIPE SEEDS.—The Hon. Secretary read an article from the Melbourne *Leader* on growing plants from unripe seeds, as follows:—

Some time ago Mr. J. C. Arthur published in the *American Naturalist* an interesting paper on "Deviation in Development Due to the Use of Unripe Seeds." That unripe seeds could germinate was known to Theophrastus 300 B.C., and has been the subject of investigation by many observers since. The author gives a very complete list of references to experimenters, alluding, among later ones, to Duhamel in 1760 (with ash and walnut), to Senebeir in 1800 (peas), and to Seffyer, 1822. This last observer took unripe green fruit of *Sophora japonica*, dried it, and obtained 500 young plants, though, as a rule, the plant does not ripen its seed in Germany. He also refers to the exhaustive treatise of F. Cohn in 1847, entitled "*Symbola ad Seminis Physiologiam*," in which that author reviews the previous history, and records results of his own experiments with more than twenty widely different species, raised from seeds in various stages of immaturity.

After discussing the disputed question as to what constitutes actual maturity, he quotes Nobbe's statement as representing the present usage:—"The continued life of the embryo is not dependent upon the completion of the storing of reserve material in the seed; the power of germination appears much earlier, even in a stage of development of the seed undoubtedly to be designated 'unripe.'" The author then proceeds to give statistics from several experiments. Thus—"Goff, in 1884, planted tomato seed in March in boxes in the green house, sowed the previous season from fruit still thoroughly green, and obtained only 2 per cent. of vegetation. But of seed from fruit of full size, which has begun to lose its green color, although not showing any tinge of redness, as many as 84 per cent. vegetated, while from fruit with a faint reddish tinge the percentage of vegetation reached 100." "Nobbe found that seed of spruce fir (*Picea vulgaris*) gathered on the 1st and 15th of each month, from the middle of July to November 1st, and tested in the laboratory in the following January, gave increased percentages of germination according to degrees of maturity." The percentages rose from 0, when the seed was gathered on July 15th, to 40.8 on August 1st, to 75.3 on September 1st, and to 88.2 on November 1st."

After recalling the fact that fruit may ripen after the bough which bears it has been removed from the tree, he adds that Cohn first observed that green seeds entirely removed from the fruit and laid in moist earth or sand, passed through the various changes of color of normal ripening. He experimented with seed of apple, pear, beans, lupins, &c. Lucanus corroborated this fact with rye, showing that the weights of grain continued to increase, as the latter was left in the ear alone without the stalk; in the ear still upon the cut stalk; and lastly, with the roots in water. The general result is that there is an optimum period for germination, as over-ripening is as harmful as under-ripening, since all grains after a longer and shorter time lose their power of germination. Passing on to the effects, the first and most obvious in the germination of unripe seeds is the weakness of the plants and their undersized condition. Many perish by failing to rise to the surface of the earth. The rate of germination is also slower than the normal. Thus with wheat, of fifty grains, twelve still with milk germinated on the eleventh day; of grains turned yellow, nineteen had appeared in the same time; while of fully ripe grains, twenty-five had appeared. "Owing to their weakened condition, the plants from immature seed are less able to withstand unfavorable conditions than those from ripe seed, the difference being more marked the younger the seeds. In my own attempts to grow very green tomato seeds in the greenhouse fully 85 per cent. of the plants that had unfolded the cotyledons, perished before reaching the third leaf." Similarly for winter rye, Wollny raised 41 per cent. from very green grain, 91 per cent. from grain in the milk, and 100 per cent. from pale yellow and from fully ripe seed.

The author conducted experiments with tomatoes, and although the appearance of fully grown plants did not always show their deficiencies their weights revealed the fact that they had never recovered the ill effects of the unripeness of the seeds when first they germinated. Thus plants raised from the seed gathered from green fruit gave the average weight of a single fruit in grms., 17.5; from half ripe fruit, 17.9; and from fully ripe fruit, 19.4. These were calculated from 1,044, 439, and 1,889 ripe fruits respectively. From comparative results of growths, "without going into further details, the general principle may be stated, that plants from green seed will, as a rule, attain a smaller development in both vegetative and reproductive parts than those from ripe seed." But "the use of immature seed increases the reproductive parts at the expense of the vegetative, and thus it comes about that there is more fruit formed in proportion to the amount of foliage than normally."

As the result of the cumulative effects of repetition through several generations "it was found that a tomato plant, selected as representative of the series grown from unripe seed, bore 3½ lb. of fruit to 1 lb. of leaves, stems, and roots taken together; while a plant of the same variety, grown each year under the same conditions, but always from ripe seed, gave only 1½ lb. of fruit for each lb. of plant. . . . With this increased fruitfulness is also associated an increase in the number of fruits, although they are individually smaller, as also are the seeds.

Another feature of importance is the tendency to an increased earliness in ripening the fruit

on plants raised from immature seeds. "In the cumulative trials of tomatoes by Goff, just referred to, the strain from green seed ripened from ten to four weeks earlier in different years than the corresponding series from ripe seed." The author supplies a table showing (in Goff's experiments of fifty seeds taken from each of the following stages of maturity), the number per cent. which vegetated, and the number of days before the first ten fruits were ripe, as follows:—From very green fruit, 2 per cent., 137 days; from pale green, 84 per cent., 157 days; from fruit tinged red, 100 per cent., 152 days; from light red fruit, 96 per cent., 147 days; from deeper red, 88 per cent., 147 days; from fully ripe fruit 96 per cent. in 152 days. "This is not surprising in view of the fact that it is the weaker plants from which the greater earliness in fruiting is expected. . . . It was noted by Goodale in 1885, and since by Goff, that some early market variety of vegetables indicated that they may have been originated from the use of green seed."

The author then summarises the results under the following heads:—"1. There is a loss of vigor shown in the smaller percentage of germinations, the weakness of the seedlings and the greater number of plants which die before maturity. 2. The full vigor of the plants is never recovered, although they may, and usually do, produce an abundant harvest, and one acceptable to the cultivator, in case of economic plants. 3. The reproductive parts of the plants are increased in proportion to the vegetative parts, resulting in a greater number of fruits and seeds (although individually smaller), and more rapid ripening of them than in similar plants from mature seed." The general interpretation he expresses in the following sentence:—"The deviation in development which comes from the use of unripe seed does not differ in kind from that resulting from any other method of weakening the organism. It is only a special instance of the effect of checking the uniform normal growth of the individual."

It has been long known that analogous results accrue from using very old seeds, as in the case of the melon. Thus, M. F. Cazzuola found that melons raised from fresh seed bore a larger proportion of male flowers than female, while older seed bore more female flowers. M. Triewald grew twenty-one out of twenty-four melon seeds which were 41 years old. The branches were very slender, yet they produced both early and plenty of good melons.

"The retardation of the germination due to age is well shown by the tests of tomato seeds made by Lovett, in which seeds from 2 to 6 years old showed the first germination in 10 days; 7 years, in 11 days; 8 and 9 years in 12 days; 10 and 11 years, in 14 days; and 13 years, in 18 days. It will be observed that the effect of over-immaturity is the same as results from immaturity. . . . It is evident, therefore, that ageing as well as immaturity of seeds leads to weakness of the seedlings and a general lowered vitality."

Practical results may be deduced, which may be left to the experimenter to carry out, with such garden plants as are cultivated for their fruits. Like experiments should be made to test the effect of immaturity of the seeds upon plants *e.g.*, annuals—cultivated solely for their flowers, but for plants of which the roots, stems, and foliage are desired, it would seem that fully ripe seeds should always be chosen. For fruits, at least, it is quite evident that the cultivator may look for larger and earlier crops, though of diminished size, when immature seeds are used.

Riverton, April 22.

Present—Messrs. H. A. Davis (Chairman), T. Gravestocks, D. Kirk, W. Hannaford, J. Kelly, A. Hannaford, F. M. Calf, H. A. Hussey (Hon. Sec.), and one visitor.

MANURES AND SEED DRILLS.—Mr. Gravestock read a paper, giving his experience on this subject. He had come to the conclusion that the practice of drilling in the seed with the fertilisers gave the most successful results. While he had best results from Thomas phosphate on his land, which was loose loam with limestone subsoil, other fertilisers would doubtless give better results on different soils, and it was only by experimenting that each farmer could decide which was the most profitable manure for his land. He strongly recommended farmers to be on the look out for inferior fertilisers, and purchase only guaranteed articles. Some Thomas phosphate he had received was lumpy, and he understood it was one-third less value than the very finely ground material. Mr. Davis said fertilisers had revolutionised farming in this district. Given a fairly good rainfall, there was no doubt other districts would show similar results. He believed that in this district the best results from the fertilisers would be obtained from the poorer soils. He had best results from Thomas phosphate, though English super. and bonedust had given good returns. Mr.

Hussey thought the most economical method of finding out what manures they should apply to the soil would be to have the soils analysed, to show what was required. Mr. W. Hannaford thought schools or classes for teaching elementary chemistry should be established in the farming districts. Until the farmer knew what his land was deficient in there was bound to be a great waste of labor and fertilisers. He advocated deeper cultivation, so that the moisture would be better conserved in the soil. Mr. Kirk said he had no apparent benefit from use of English super., Thomas phosphate, or super. guano on his land. Mr. Kelly thought this showed that either the wrong manures were used or Mr. Kirk's land did not require any. He favored English super. His return last year from manured crops was 16bush. per acre.

Strathalbyn, April 17.

Present—Messrs. M. Rankine (Chairman), Hon. J. L. Stirling, D. Gooch, G. Sissons, R. Watt, W. M. Rankine, A. Rankine, H. H. Butler, J. Cheriton (Hon. Sec.), and one visitor.

THE RECENT CONFERENCE.—Members re-discussed the papers, addresses, and discussions connected with the recent conference of Southern Branches of the Agricultural Bureau at Strathalbyn.

Lyndoch, March 23.

Present—Messrs. H. Kennedy (Chairman), J. M. Sim, G. A. Hill, W. Rushall, M. Burge, S. Sage, W. McIntyre, R. Ross, A. Springbett, R. Loveridge, and J. Mitchell (Hon. Sec.).

FARMERS' RELIEF FUND.—Members suggest that every farmer should contribute ½d. per acre annually to this fund for the purpose of assisting all farmers who may suffer losses.

Clarendon, April 13.

Present—Messrs. J. Spencer (Chairman), A. Harper, J. Wright, W. Spencer, and A. L. Morphet (Hon. Sec.).

FARMERS' RELIEF FUND.—Members are opposed to the establishment of a permanent relief fund, but would be willing to help whenever necessary.

FERTILISERS.—Mr. Spencer said he had used 3cwts. Thomas phosphate per acre the season before last, and 3cwts. per acre of English super. last season, for a hay crop, but got no return. He thought he had put on too much manure. [Perhaps you used the wrong manure for a hay crop. Would it not have been better to use sulphate of ammonia or nitrate of soda?—GEN. SEC.].

Lyndoch, April 20.

Present—Messrs. H. Kennedy (Chairman), W. J. Springbett, W. J. Lawes, R. H. Payne, R. Ross, J. Mitchell (Hon. Sec.), and one visitor.

VINE PRUNING.—Hon. Secretary reported that Professor A. J. Perkins, Government Viticulturist, had promised to visit this district on 9th or 16th June, to give a demonstration in the art of pruning vines. A sub-committee, consisting of Messrs. Kennedy, Rushall, Ross, Sage, and the Hon. Secretary, was appointed to conduct all the arrangements.

FRUIT TREE PRUNING.—Four gentlemen of Angaston and Nuriootpa, especially well qualified, are to be requested to give practical demonstrations of the art of pruning fruit trees in this district, and the above sub-committee is to take all arrangements in hand.

EXHIBITS.—By Mr. Payne—Specimen of Rome Beauty apple grown in Sandy Creek scrub; very fine. Mr. W. J. Springbett tabled fine heads of White Kaffir corn and a bunch of *Paspalum dilatatum* grass 6ft. high.

Orroroo, April 21.

Present—Messrs. J. Moody (Chairman), G. Matthews, J. Jamieson, W. S. Lillecrapp, W. H. Roberts, H. C. Ives, M. Oppermann, and T. H. P. Tapscott (Hon. Sec.).

OFFICERS.—The Chairman and Hon. Secretary were re-elected and thanked for past services.

PICKLING WHEAT FOR SEEDING.—Members agreed that bluestone in solution will destroy germs of bunt on seed wheat if it is properly used. About 1oz. bluestone (sulphate of copper) is enough to treat 1bush. of seed. Some farmers use 1½ozs. for each bushel. Some people sprinkle the solution over the seed on a floor, and turn it over several times, whilst others steep their seed in the liquor.

SMELTER SLAG.—A member wished to know whether the slag at the various smelting works would be of value as a phosphatic fertiliser if it were pulverised. [No. Basic slag (or Thomas phosphate) results from smelting of iron ores, rich in phosphoric acid, by the Bessemer process. This slag is pulverised and becomes basic slag (generally called Thomas phosphate). There are many places where the iron ore contains no phosphoric acid, or very little of it; but some of the smelters grind up the slag nevertheless, and sell it as basic slag or under various other names. It is necessary, therefore to demand a statement of the constituents of every manure or fertiliser when purchasing it.—GEN. SEC.]

ANNUAL REPORT.—The Hon. Secretary read the annual report. The drought had been severe in the district, and the low price of wheat made matters worse. Experimental work had been checked, and none of the seeds tried had given satisfactory results owing to lack of moisture in the soil. Nine meetings had been held, with an average attendance of seven members. Several useful papers had been read, and discussions and interchange of ideas had doubtless helped in the progress of the various industries.

Koolunga, March 23.

Present—Messrs. T. B. Butcher (Chairman), J. Jones, W. T. Cooper, J. Freeman, J. Butterfield, R. Jackson, J. Button, R. Palmer, R. H. Buchanan, J. Sandow, D. Steele (Redhill Branch), G. Pennyfield (Hon. Sec.), and two visitors.

BEST WHEATS FOR DISTRICT.—Mr. Sandow had averaged 10bush. per acre for six or seven years from Velvet Pearl; he had success with Purple Straw, but got the best results from Early Para. Mr. J. Freeman found White Tuscan, Purple Straw, and King's the best for his locality. Mr. J. Button—Purple Straw and Early Para. Mr. J. Jones—Red Straw and Early Para; Steinwedel a failure. Mr. R. Jackson—For hills, Red Straw before Purple Straw; Early Para, Steinwedel fairly successful, and not so liable to shake out if sown late. Mr. R. Palmer—Purple Straw, Red Straw. Mr. J. Pengilly—Scotch Wonder on sandy soil; for clay soil, Steinwedel; for fallowed land, Leak's

Rustproof. Mr. D. Steele—For twenty years had good results from Fill-bag, a fairly rust-resistant wheat. Mr. W. T. Cooper—Fill-bag, Purple Straw. Mr. Butcher—Purple Straw, Red Straw, Scotch Wonder, Early Baart.

SELF-SOWN HAY.—In reply to questions submitted by Narridy Branch, Mr. Butcher said the best time to cut a self-sown hay crop is after the bloom has shaken off, and when the grain is of medium development, beginning to ripen. Nothing should be mixed with it to make it palatable to stock. It is a mistake to begin cutting self sown hay too early, as it then turns sour and unpalatable to the animals. Nor should self-sown hay be left standing until after the cultivated crops have been gathered in, as by that time it has probably become blackened and dry—consequently objectionable. If cut at the proper stage of maturity and quickly harvested the hay will be sweet, and readily eaten by the live stock.

Forest Range, April 20.

Present—Messrs. J. Vickers (Chairman), A. Green, R. E. Townsend, R. R. Hackett, J. Sharpe, C. Stafford, J. G. Rogers, and J. Caldwell (Hon. Sec.).

POTATOES.—Mr. J. Sharpe tabled samples of Redskin, Windsor Castle, and another, each weighing over 1lb.; also some grown from setts obtained from the Central Bureau, raised alongside the others, under exactly the same conditions; but in his estimation had proved a failure, as none were as large as a hen's egg. The fertiliser used was a special potato manure, which gave satisfactory results. Mr. Hackett thought those potatoes should have another trial, as he had found that seed from foreign parts required to be grown two years before any results could be obtained. Mr. Vickers believed Beauty of Hebron gave best results in this part. Redskin also yielded well, but there was a slight prejudice against them in the market, because when first dug they were rather waxy, but after being kept awhile they became quite floury.

SALT AS A MANURE.—Several members reported having tried salt as a fertiliser without any result.

Mount Remarkable, April 20.

Present—Messrs. A. Mitchell (Chairman), G. Yates, W. Lange, C. E. Jorgensen, T. P. Yates, H. B. Ewens, H. Humphries, J. B. Murrell, D. Roper, T. S. Bishop, T. H. Caseley (Hon. Sec.), and three visitors.

CAPABILITY OF DISTRICT.—Mr. A. B. Robin, a visiting member from Tanunda Branch, expressed the opinion that dairy farming should be profitable in this district, that lucern and other fodder plants can be grown, and that there are good prospects for raisin and currant growers.

RESIGNATION.—Mr. W. Girdham, who is 83 years of age and has resided over forty years in the district, tendered his resignation as a member of this Branch on account of being about to remove to Booleroo Centre. Members were very sorry to lose his services on the Branch.

Minlaton, April 22.

Present—Messrs. James McKenzie (Chairman), D. G. Teichelmann, B. Higgins, H. Boundy, S. Vanstone, John Anderson, and Jos. Correll (Hon. Sec.).

DROUGHT-DISTRESSED FARMERS' FUND.—After discussion on this subject the following resolution was carried unanimously:—This Branch has no sympathy with the idea of establishing a permanent relief fund. Members consider

it a mistake to keep the farmers on land that cannot be farmed profitably, and expressed the opinion that at any time deserving farmers needing help would be sure of getting it.

BAGS AS WHEAT.—Some discussion took place on this subject. Some of the members considered that an injustice was being done to the farmers, who were compelled to sell as wheat for about 1½d. bags that cost them 5d. to 6d.

KAFFIR CORN.—The Hon. Secretary tabled fine samples of Red Kaffir corn.

Koolunga, April 20.

Present—Messrs. T. B. Butcher (Chairman), R. Leary, J. Jones, W. J. Jose, A. Craig, E. J. Shipway, R. Jackson, J. Button, G. Pennyfield (Hon. Sec.), and one visitor.

EXPERIMENTAL PLOTS.—It was decided to award a certificate to any person who shall show the best experimental plot in the district.

EXHIBITS.—Mr. W. J. Jones tabled Red Kaffir corn and Florida Velvet bean—neither very good on account of the dry weather.

Nantawarra, April 25.

Present—Messrs. S. Sleep (in chair), A. F. Herbert, A. L. Greenshields, and T. Dixon, jun. (Hon. Sec.).

TAKEALL.—Mr. Greenshields asked if members thought there would be any danger of takeall in crops drilled in at the present time. [If the circumstances had been given it might have been possible for some member of the Bureau to answer the question. Presumably the inquiry referred to the effect of drilling in the seed while the ground is dry—GEN. SEC.]

FERTILISERS.—Mr. Herbert asked whether the deposits of mud in the salt lake were likely to be of any value as fertilisers. [Yes, if used in moderate quantities.—GEN. SEC.]

WHEATS FOR DISTRICT.—The Chairman asked whether for this district a good stooling wheat was best. Mr. Nicholls thought the early wheats were most profitable, and as a rule these did not stool well. Other members agreed.

Quorn, April 20.

Present—Messrs. R. Thompson (Chairman), J. B. Rowe, John Cook, F. Herde, G. Altmann, James Cook, C. Patten, J. Johnson, H. S. Stacey, W. Toll, G. Baker, H. Cowan, A. F. Noll (Hon. Sec.), and one visitor.

FARMING IN THE NORTH.—Mr. Rowe read a paper on this subject. It was recognised by all that it was impossible to grow cereals with insufficient moisture, but much could be done to make the fullest use of their limited rainfall by a proper system of fallowing. They must adopt better methods of farming, but to do this larger farms were required; in the Areas 1,000 acres at least, and north of Goyder's line of rainfall 5,000 acres were required to make the best use of the land. The farms must be large enough to combine grazing with wheat-growing. He thought the old method of preparing the land for seeding might be considerably improved. Generally they commence to plough during the hot weather of February, March, and April, which should be superseded by the proper method of fallowing in July, August, and September. By doing this the cost of production is lessened and the yield increased. Being ploughed

up in winter the rain penetrates into the subsoil, and is conserved there, instead of running off in the watercourses. Experience has proved that in dry seasons especially the fallow land produces the best return. One crop only should be taken off, and never more than two in succession. The earliest maturing wheats should be grown to escape the effects of the hot drying winds of early summer. Change of seed is also desirable. Seeding should be finished by the end of May. With regard to ploughs he found a light steel three-furrow stump-jump plough very useful. A lad with smart team of six horses could turn over four acres a day, and with a four-furrow plough and eight horses five to six acres could be ploughed daily. To improve the ploughing the Branches should organise ploughing matches to encourage the young men to pay attention to this branch of their work. Several Branches could unite to hold such matches. Before commencing to fallow he would cart out all farmyard manure—not later than July—and spread it evenly and thinly over the ground. Ploughs should be in proper order, so as to do economical work. The depth to fallow would depend on the subsoil; 5in. to 6in. would be about the average. Scarify the fallow to keep it free from weeds. Sowing should be commenced in April, and an even and well prepared seed-bed was required to produce an even crop. He recommended Early Baart, King's Solid Straw, Steinwedel, Early Para, and Early Show as best for this district. The crop should be rolled while the ground is moist. This will conserve the moisture, break up clods, and prevent damage to the mower, which will last much longer and cut cleaner on an even surface. The paper was well discussed, members generally agreeing with Mr. Rowe. Several members favored working the land during the summer.

EXHIBITS.—Chairman tabled cobs of maize 9in. long, matured in sixteen weeks from planting seed. Mr. James Cook tabled fine samples of quinces weighing about 1lb. each.

Lyrup, April 4.

Present—Messrs. T. Nolan (Chairman), A. Pomeroy, P. Brown, T. R. Brown, A. Weaver, W. Healy, J. Tye, A. Thornett, D. Thayne, D. J. Bennett, W. H. Wilson (Hon. Sec.), and two visitors.

BEST WHEATS FOR DISTRICT.—A discussion took place on this subject. Purple Straw, Rattling Jack, Steinwedel, and White Tuscan were mentioned as suitable wheats, but defaults in all but the first-named were referred to, and no decision arrived at as to which were the three best suited to the district.

POTATOES.—A discussion ensued on time to dig potatoes. One member considered they should be fully matured and allowed to dry in the ground before being lifted. Another thought that the potatoes could be safely dug once the skins become fixed.

Inkerman, April 25.

Present—Messrs. G. Peter (in chair), J. Lomman, S. Wills, C. H. Daniel, and W. A. Hewett (Hon. Sec.).

PICKLING SEED WHEAT.—A discussion on this subject took place. Mr. Daniel had known of several cases where pickled seed had not been so free from bunt as the untreated seed. Chairman strongly advised pickling seed when there is the slightest moisture in the soil. Mr. Lomman pickled with bluestone and had but little bunt.

FERTILISERS.—Mr. Daniel tabled sample of superphosphate from Adelaide Chemical Works. It was very lumpy, and had to be crushed and sifted before it would go through the drill.

Paskeville, April 23.

Present—Messrs. H. F. Koch (Chairman), A. C. Wehr, W. Ayles, A. Bussenschutt, W. Westphale, T. Trebilcock, A. Goodall, J. Bussenschutt, F. Bussenschutt, and J. H. Nankervis (Hon. Sec.)

FIELD TRIAL SOCIETY.—Committee reported that a suitable piece of land had been selected for the field trial of harvesting implements next spring, and that the necessary arrangements, including purchase of fertilisers, had been made for putting in the crop.

DEHORNING CATTLE.—Members were in favor of this practice.

FORAGE CROPS.—Members considered hay crops the best forage for this district.

Port Pirie, April 20.

Present—Messrs. P. J. Spain (Chairman), E. J. Hector, R. F. Humphris, J. Lawrie, W. K. Mallyon, and R. J. Ferry (Hon. Sec.).

CODLIN MOTH—Mr. Mallyon stated that local fruit shops and hawkers were disposing of apples infested with caterpillars of the codlin moth. If this pest obtained a hold in the orchards at Laura and elsewhere in the district the results would be disastrous. It was resolved to recommend four gentlemen to be appointed as honorary inspectors under the Act.

SEASON.—Mr. Hector stated that the young pasture which was started by the early rains was now drying up. The rainfall at Valencia, ten miles south from Port Pirie, from January 6 till date, was—January 6, 1.49in.; February 4, 1.275in.; March 4, 0.30in.; total, 3.075in. The total fall for 1898 was 11.410in. Mr. Lawes stated that the rains had caused grape vines to start fresh growth, and he wished to know if it would injure the next season's yield. The Hon. Secretary replied that no injury would result if the growth were only from the upper buds.

FRUIT-GROWING.—Mr. Mallyon said that all his fruit trees were thriving splendidly, especially the lemons and oranges, which were loaded with fruit. Peaches also bore well. He had not applied any water, and considered irrigation a mistake. The soil was light, loamy, 3ft. or 4ft. deep, resting on limestone rubble or marl, over a limestone crust, under which was a red clay.

Robertstown, April 27.

Present—Messrs. N. Westphalen (Chairman), A. Day, H. Rohde, J. E. Milde, F. Fiedler, T. Hagley, J. Armstrong, S. Carter (Hon. Sec.), and one visitor.

BULL.—Chairman and Mr. Hagley had inspected the bull loaned by the Department of Agriculture, and found him well kept and in good order. Fifteen common cows had been served. Perhaps the reason why more use had not been made of the bull was because the season was late when he came into the district.

MILK-TESTING.—Mr. Westphalen practically illustrated the method of testing milk brought in by members. He explained the different processes of separating the butter fat from the milk. He had experienced opposition to the introduction of the system. His primary idea was to induce farmers to improve their dairy herds. Under the old way a man suffered loss when his cows gave rich milk, but little of it, as compared with others whose cows gave poor milk but greater quantity. By selling according to quality the first man would receive justice and the latter would be induced to improve his stock.

INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Intercolonial Labor Federation.

An Intercolonial Labor Federation Conference will open in Brisbane this month (May 4). The colonies directly represented will be Queensland, New South Wales, Victoria, and South Australia. Since the conference held in Adelaide in September last, special attention has been paid in the colonies named to the question of intercolonial labor federation with a view to the discussion of the subject in all its bearings at the Brisbane Conference. What is known as the Ballarat scheme of 1891 has been in operation, so far as district and provincial councils are concerned, in Queensland for some years and in New South Wales for a shorter period. The following is the scheme as amended by the committee recently appointed by the Trades and Labor Council of this colony for the consideration of the Conference :—

Name.

1. The name shall be "The Australasian Federation of Labor."

Constitution.

2. The federation shall consist of labor unions consolidated for mutual assistance and the furtherance of the cause of labor generally, and shall be governed as hereinafter provided.

Objects.

3. The following shall be the objects of the federation :—(a) To improve the condition and protect the interests of all classes of labor throughout Australasia. (b) To discuss, consider, and put in force, when approved, any scheme for the better guidance and extension of Australasian labor organisation. (c) To prevent, if possible, by conference or otherwise, any threatened strike or dispute between members of the federation and their employers, and to endeavor by conciliatory measures to uphold the rules of any federated body ; failing which, to provide ways and means for the maintenance of the union involved. (d) To secure the direct representation of labor in Parliament, and promote such legislative reforms as will insure social justice to Australasian workers. (e) To secure a better advocacy of the principles and rights of labor through the press.

Payments.

4. Each and every affiliated union shall pay to the district council of the federation under which it is governed the sum of fourpence per month for each one of its financial members, payment to be in advance, and to commence from date of admission. Of this fourpence, one farthing shall be paid through the provincial council to the general council for its sustentation, twopence to a defence fund in each district council, the balance to be apportioned for management and organisation purposes as may be decided by the respective provincial councils. Women's unions shall be admitted to full affiliation upon payment of half the above dues. Provided that nothing in these rules shall prevent provincial or district councils from making such further financial arrangements for internal government as may appear to them necessary, so long as such arrangements are not in contravention of these rules.

Organisation.

5. For the purpose of facilitating the working of the federation, its unions shall be grouped into districts, governed by district councils, the district councils in each province to be severally represented on a provincial council, which shall be the central authority for the said province, and shall be subject only to the general council of delegates representing the whole federation.

General Council.

6. The general council, which shall meet at least once in each year, shall be composed of one delegate from each district council having not more than 5,000 members, and for every additional 5,000 members (or part thereof) one additional delegate. The general council shall be invested with the following powers:—(a) To order a plebiscite of the federation upon any question of amending, rescinding, or making rules for the government of the federation. (b) To elect or remove any of its officers (except the general president, general secretary, and general treasurer, who shall be elected by a plebiscite vote of the federation). (c) To control the general council fund. (d) To decide all appeals against the decision of the general executive. (e) It may institute legal proceedings on behalf of the federation, and may direct the general trustees to take legal proceedings against any officer of the federation who misappropriates its funds. (f) It shall see to the carrying out of the objects of the federation in strict accordance with the general rules.

The expenses of all delegates to general council meetings shall be defrayed by their respective provincial or district councils. The official seal of the federation shall be attached to every document issued by the general council, and no document emanating from the general council shall be received or discussed by provincial or district councils unless the said seal is so attached.

General Executive.

7. The general executive of the federation shall consist of a general president, general secretary, and general treasurer, who shall be elected in February of each year by plebiscite of the federation, and of the provincial presidents, who shall hold seats on the general executive by virtue of their office. The powers of the general executive shall be limited to the superintendence of the federation in the interim between the meetings of the general council. It shall take every means to secure the due observance of the rules of the federation, to further its objects, and protect the funds. It shall direct the action of the trustees, and be responsible for the rightful administration of the general fund in accordance with the instructions of the general council. It shall have power to summon special meetings of the general council when deemed necessary. It shall, on request from any provincial or district council, determine as to the interpretation of any general rule, or decide any matter on which the rules are silent. The decision of the general executive in all such cases to be subject to appeal to the general council, whose decision shall be final.

Special General Executive Meetings.

8. Any provincial council may, by a two-thirds majority, request the general secretary to summon a meeting of the general executive for the consideration of special business, the nature of which shall be fully stated. Such meeting shall be held as speedily as possible after the receipt of the summons by the general secretary, who shall, in convening the meeting, inform each member of the general executive of the special business to be transacted. Should the general executive, however, deem the business or object of the meeting frivolous, the expenses of such special meeting shall be defrayed by the provincial council at whose instance it was summoned.

Provinces.

9. The provinces of the federation for the time being shall be:—The northern province, comprising the present colony of Queensland; the eastern province, comprising the present colony of New South Wales; the southern province, comprising the present colony of Victoria; the central province, comprising the present colony of South Australia and the Barrier District of New South Wales; the western province, comprising the present colony of Western Australia; the Pacific province, comprising the present colony of New Zealand; and the Tasmanian province, comprising the present colony of Tasmania; or such of these provinces as may come under the jurisdiction of the Australasian federation.

Provincial Councils.

10. Provincial councils shall meet within four weeks prior to the general council annual meeting, and at such other times as they or their executives may deem necessary. It shall be the duty of each provincial council to adopt by-laws dealing with its constitution and functions, always provided that such by-laws are in strict conformity with the general rules of the federation.

Provincial Executives.

11. The executive management of provinces of the federation in the interim between provincial council meetings shall be entrusted to such officers as may be instituted by the provincial council rules, which officers shall be designated as provincial president, provincial secretary, &c. Provincial presidents and provincial secretaries shall be elected by a plebiscite of their respective provinces.

Organisation of Districts.

12. Districts shall be organised as may seem advisable to local affiliating societies, and shall afterwards be chartered by the general executive upon the recommendation of the provincial council in whose jurisdiction they are situated. The federation shall recognise only such districts as affiliated which are working under such charters.

District Councils.

13. District council rules dealing with their constitution and functions shall be framed by the respective districts, but such rules must not clash with the general rules of the federation, or with the rules of the province in whose jurisdiction districts are located. District executive officers shall be designated as district president, district secretary, &c.

Action on Disturbances.

14.—1. In the event of a disturbance threatening an affiliated union, such union shall endeavor to settle the dispute peaceably, failing which it shall submit its case to its district executive, who shall act in conjunction with a committee of the union involved. This joint committee shall endeavor to settle the dispute in a peaceful and friendly manner; failing which, the joint committee shall take such action as in their opinion the circumstances may necessitate, and shall without delay report the matter to the district council. The district council shall place the question in dispute before the affiliated unions, and shall be governed in its subsequent course by their decision.

11. Before the district council shall pledge its assistance to any disturbed union it shall obtain the results of the voting in the various affiliated unions, the voting to be conducted according to the rules of such district council; but in any case a majority of the votes cast shall be necessary before the council shall pledge such assistance. Should the threatened disturbance show a likelihood of affecting any other district or province, the joint consideration of the

provincial or district councils interested shall be given it in accordance with the provisions of this and the preceding section, and none shall act without the consent of the others affected. In case of great emergency a meeting of the provincial councils shall be called.

III. When it has been decided to financially support an affiliated union the district council shall make arrangements for financial support to the extent of a sum not exceeding 20s. weekly for each financial member locked out or on strike, such support to be distributed as the union in question may think fit. Provided that in no case shall such support be given during the first week of any disturbance.

IV. Any decision of a district council involving action shall endow that council with the following powers of levy, unity, and censure within its jurisdiction.—(a) To levy a special contribution upon every employed enrolled member in its district. (b) To strengthen the disturbed union or unions by securing in the name of the federation the active co-operation of other unions in other districts, and to take any other steps for ensuring the united action of workers which the urgency of the case may require. (c) To censure, in the name of the federation, any corporation, firm, or individual whose conduct shall, in its opinion, show them to be unjust, cruel, or bitter enemies to labor; it shall communicate such censure where necessary to its provincial executive for general notification; and it shall be obligatory upon members of the federation to give effect to that censure.

V. The powers provided in the preceding section shall be exercised upon a majority decision of a district council, which shall assume control of all disturbances in conjunction with the strike committee of the union or unions involved, and shall cease with the termination of the dispute.

VI. The federation reserves to itself the right of withholding assistance from any affiliated body entering upon a strike without having received the sanction of its district council.

The "Labor Gazette."

An article on "The Labor Market in 1898," published in the *Labor Gazette* for February, shows that, according to the returns received by the Board of Trade, 1898, was an exceptionally good year as regards employment. In the engineering, shipbuilding, metal, building, and miscellaneous trades the employment returns from the trade unions showed that only 3 per cent. of their total membership (466,754) were unemployed—a lower percentage than in any of the last seven years. Coal mines worked on an average $5\frac{1}{4}$ days per week throughout the year, or more than in any of the three years 1895-97; iron and steel works showed an improvement in 1898 as compared with 1897; the pig-iron trade was better than 1897, and considerably better than 1896; the tin-plate trade was rather worse than 1897; in the woollen and worsted trades there was a very slight, but in the cotton trades a marked improvement; and agricultural laborers were generally well employed throughout the year. Another article in the same issue on "Accidents to Workpeople" states that in 1892 the number of workpeople reported as killed in industrial accidents was 3,955, or 75 fewer than in 1897, and 196 fewer than in 1896. As regards 208 of the cases in 1898 no death-rate can be stated. The remaining 3,747 occurred among 5,291,998 workpeople, or at the rate of about 71 deaths per 100,000 employed. In 1897 the corresponding death-rate was 72, and in 1896 75 per 100,000. The detailed statistics show that of every 100,000 seamen employed 691 were either drowned or killed in other ways in 1898. In the case of workers in mines 138 per 100,000 of underground workers were killed, and 89 per 100,000 of surface workers were killed. In quarries the

death-rate was 108 per 100,000 employed, a rate almost identical with that for railway servants. Among factory operatives the rate was 15 per 100,000 employed. In regard to non-fatal accidents the number on railways and in mines declined, while those in quarries and on ships somewhat increased. The net effect of all the increases and decreases is an increase of 15,822 in 1898, as compared with 1897, and of 22,255 as compared with 1896.—*The Times*.

The Management of Machinery.

BY INSPECTOR BANNIGAN.

Safeguarding Machinery.

Generally speaking, all contact with a shaft in motion should be avoided, and all those which are carried across floors or along passages should be covered with a casing of wood or sheet-iron. All couplings, whether so covered or not, should present smooth-running surfaces, and this may be accomplished either by countersinking the holes to receive the heads and nuts of the coupling bolts or by the use of an iron collar cast with cavities to receive the projecting ends of the bolts or keys, and secured to the shaft by means of a let-in screw.

In connection with revolving shafts there is nothing more dangerous than projecting keys or bolts, which are liable to catch the loose portions of the clothing of persons coming into contact with them, and are responsible for some of the most shocking accidents on record. These accidents are often brought about by the use of aprons or loose-fitting clothing, which may become entangled in the machinery during the process of oiling, or taking the temperature of the bearings, or through the attention being taken up by some other matter in the immediate vicinity of the revolving shaft. Flywheels, cogwheels, and pulleys are often keyed on shafts leaving the thick end of the key—often with a shoulder—projecting a couple of inches from the hub to facilitate removal when repairs or alterations are necessary. As already pointed out, this, though apparently of little importance, is a very serious source of danger, and the key ends should always be masked by using the loose collar described above.

Belts used for connecting the different machines with the driving shaft are often thrown off and remounted with the hand. This is always attended with a certain amount of danger, more particularly in the case of powerful machinery, and even the most expert workmen rarely escape injury of some sort.

When it becomes necessary to replace a belt while the machinery is running the work can best be done by means of a fixed belt-mounter. Some slight expense is, of course, necessary in providing this appliance; but as it completely does away with all danger to workmen while engaged in mounting the belt, it will be found cheap in comparison with the danger of replacing the belt in the ordinary way by hand. The appliance is composed of a piece of strong wood of a thickness and width suitable to the size of the belt to be mounted. It revolves round a socket which encircles the shaft, but does not touch it; the end of the arm is consequently always equi-distant from the rim of the pulley, i.e., it moves concentrically with the pulley. The wooden arm projects a few inches over the rim of the pulley, and is obliquely (about 45°) cut off against the rim. It is fastened to a loose collar which revolves round a socket made in two sections, encircling the shaft and secured by means of a tongue to a support attached to the nearest beam or other suitable holding ground. It will be seen that the arm touches no part of the revolving shaft or pulley, and, when not required for holding the belt, hangs loose in any position that is desired. It retains its position by friction on the socket, and when its use is required the belt is placed over the oblique end, which causes it to impinge on the rim of

the pulley, and, by drawing the arm in the direction in which the latter is revolving, the friction causes the arm to turn, and the belt is automatically mounted.

Rapidly-moving belts, which are liable to slip off or have to be displaced for any purpose while the driving disc is running, should be provided with belt carriers to prevent the belt from resting on the revolving shaft, where it would be liable to become wound up. The carrier is usually constructed of a piece of iron secured to any convenient support, and terminating in a hook with a flat surface for the belt to rest on, and having the terminal point with an upward spur of 2in. under the rim of the pulley.

All shafts should be provided with loose pulleys for throwing off the driving power, and the belt-fork may be manipulated from any point that is desired by means of ropes.

All pulleys and belts which revolve near the floor, or are so situated that passers-by may be caught by them, should be enclosed with boards or halustrades. Belts traversing the floor are particularly dangerous, and should be railed off to the height of at least 3ft. Horizontal belts running at a height sufficient to allow persons to pass under them should be provided with safety-boards or ladders to carry the belt in case of breakage or slipping off the pulleys.

The Salt Industry of South Australia.

"Salt is good."—St. Mark ix., v. 50.

"Salt is good!" It therefore became a symbol in Eastern countries. As a portion of daily food it pointed to hospitality; as a preservative it was the emblem of fidelity and friendship; and down to the present day the eating together of bread and salt is the token of mutual friendship.

Now, nature has bountifully supplied South Australia with salt. Throughout the province are scattered salt lakes, whose dazzling whiteness in the summer makes an interesting variety in the aspect of the country. Many of these lakes are, owing to their inaccessible situation of no commercial importance. On the other hand, there are a number whose locality meet in every respect the exigency of trade. These latter are for the most part situated on Yorke's Peninsula, which district has naturally become the centre of a rapidly expanding salt industry.

The possibility of a salt trade in this province was early recognised, but for a long time all enterprise in this direction failed owing to a want of scientific knowledge as to the proper method of treating the crude article. The record of the Patent Office for those days give a history of baffled effort. Worse than their failing was the prejudice left with the consumers as to the result of using an impure article.

At length the problem was solved, and it was due to the inventors of the patented process, now the property of the Castle Salt Co-operative Company, Limited, that salt equal to, if not excelling in purity, the imported article, was successfully placed on the local and other Australasian markets.

Under the new process purity, tested by analysis in Australia and London, and confirmed by use, rapidly dissipated all former prejudice, and led to the growth of trade indicated by the figures given below.

There is still much to be done before the industry can reach its zenith. Chemistry, and ever-improving mechanical appliances, have accomplished wonders; but to meet the growing requirements of the trade, and attain that economy necessary to meet competition, it will be necessary to scrape and work the salt lakes in a less primitive manner than at present. To do this will involve

heavy expenditure in permanent works and conveniences. To encourage the requisite enterprise and outlay, and indeed as a *sine qua non*, the tenure of the present leases of the lakes must be improved.

The difficulties of shipping the enormous tonnage of salt which now annually leaves Yorke's Peninsula have already the attention of the authorities, who may be depended upon to take all proper measures to facilitate so important an industry.

Salt begins to "make" on the lakes in December or January, and remains in a substantial crust until the rains set in, about March or April. Between these dates the lakes are actively worked. It is reckoned during the season 1898-9 from 40,000 tons to 50,000 tons were scraped. To accomplish this work some 300 to 400 men have been kept in continual employment on the lakes. Scraped and stacked on the lake's edge, the salt has to be bagged, loaded on wagons, carted to the factories for treatment, and then shipped.

The work of carting and delivering salt to the factories is for the most part carried out by the farmers in the district, who, after the completion of their own harvesting, thus find remunerative employment for themselves and their splendid teams of locally bred horses.

The principal salt factories are at Edithburgh, a pretty little township at the very edge of the sea, and now in a very thriving condition under the influence of the salt industry. At the height of the season from early morn the heavily-laden four-horsed wagons pour into the township, pass over the weigh-bridge, and discharge their contents into huge sheds. It is on record that as many as eighty wagons and teams have been seen in the township at one time.

After being treated at the factories, the salt in various forms, conditions, and packages, adapted for the requirements of the trade, is trucked along the inadequate jetty to the ship's side.

Already during the present season, in addition to steamer shipments, the following sailing ships have, at great expense, and under much difficulty, owing to the insufficiency of the jetty, been loaded for various Australasian ports by the Castle Salt Co-operative Company, Limited:—*Margarita*, 825 tons; *Lake Erie*, 800 tons; *Royal Tar*, 681 tons; *Piako*, 466 tons; *Avanti Savoia*, 450 tons; *Angeronu*, 400 tons; *Norfolk Island*, 350 tons; *Sophocles*, 300 tons; *Romanoff*, 285 tons; *Stanley*, 251 tons; *Lark*, 225 tons; *Acacia*, 210 tons; *Gio Batta Beverino*, 200 tons; *Horizon*, 200 tons; *Lizzie Taylor*, 115 tons; *Lizzie Taylor*, 114 tons—total, 5,872 tons.

Steamer shipments total about 6,900 tons. This makes a grand total of 12,772 tons.

The following table of imports and exports to and from South Australia sufficiently illustrates the expanding tendency of the salt industry:—

Year.	Imports, tons.	Exports, tons.	Year.	Imports, tons.	Exports, tons.
1891.....	1,225	7,505	1895.....	694	17,686
1892.....	832	6,373	1896.....	490	18,824
1893.....	779	7,115	1897.....	136	28,804
1894.....	763	7,624	1898.....	183	30,974

The following grades of salt are prepared for the local market and for export:—Extra fine table and dairy salt, packed in 1cwt. Hessian bags, $\frac{1}{2}$ cwt. Hessian bags, 28lb., 14lb. 7lb., and 3lb. calico bags, 1lb. packets, and 2lb. jars; butchers' curing salt, 11 to ton, bags and cwt.; bakers' fine salt, in 1cwt. bags; Eagle coarse salt, 11 to ton, bags; Emu crude salt, 11 to ton, bags. A quantity of common salt for manurial purposes is also sold.

In addition to the ordinary domestic consumption the local salt is used for the following purposes:—For curing hams, bacons, and meat; for bakers' use; for hides; in the manufacture of soap and bottles; also used for hay, sheep, and manurial purposes.

The following are analyses of the salt made by the above company in London and Adelaide:—

	By A. Volcker and Son, London.	G. Goyder, Adelaide.	J. Parkinson, Adelaide.
Chloride of sodium (pure salt)	99.07	99.54	98.99
Chloride of calcium	—	—	0.18
Sulphate of lime	0.24	—	0.36
Sulphate of magnesium	—	0.40	—
Chloride of magnesium	0.26	0.02	0.11
Alumina	0.13	—	—
Carbonate of lime	—	—	0.16
Insoluble matter	0.06	0.04	—
Moisture	0.24	—	0.20
	100.00	100.00	100.00

From the above the farmers, butchers, bakers, tanners, and the readers of the agricultural portion of this journal will see that South Australia is now able to hold its own against the outside world in the production and manufacture of salt.

Meals in Factories.

By the Factory and Workshop Act of 1878 it was provided that a child, young person, or woman should not be allowed to take a meal, or to remain during the times for those meals, in the parts of the factories or workshops specified by that Act, and empowered the Home Secretary, where it appeared to him that by reason of the nature of the process in any class of factories or workshops or parts thereof not named in the Act, the taking of meals was injurious to health, to make an order extending the prohibition to such places. The Home Secretary accordingly issued an order in 1882, and quite recently, in March last, by another order he extended the prohibition to parts of factories and workshops in which fur-pulling is carried on. In their third interim report the Dangerous Trades Committee recommended that no meal or food should be taken into or eaten in a file-cutting shop, or in the room or place where "putty powder" is used in the polishing of glass. It may not be generally known that the dust arising from putty powder is almost as harmful as whitelead itself, and when it is understood that the powder employed in many glass-polishing works contains as much as 70 per cent. of oxide of lead, the fact is not surprising. In regard to file-cutting shops—although the industry is principally a Sheffield one, the observations of the Departmental Committee indicated the degree of attention which is given to the subject of meals in factories under the Factories Acts: "The custom of taking into file-cutting 'shops' food which is frequently eaten at the 'stock' has received the careful consideration of the committee. It is stated that the prohibition of eating food in these places might inflict a certain hardship on persons who live far from their work. The workers, it is argued, will have to stand outside in all kinds of weather to eat their dinner, or else go to a neighbor's house, to a coffee tavern, or to the public-house. But, notwithstanding these difficulties, the committee believe that in making the recommendation which they make below they are choosing the lesser of the evils. The suggested provision of cupboards in which to keep food might minimise the risks, but once brought into the 'shop' it will probably be eaten there, and all the medical evidence has gone to show how important it is that food should not be eaten where it is liable to become impregnated with the

poisonous dust. And the hardship imposed on a worker in having to devote a small part of his dinner hour in walking to or from the place where his meal is eaten is in great measure compensated by the advantage derived from the change of atmosphere. Also the workshop can be thoroughly ventilated in the absence of the workers. But even were this not so, the supposed hardship would in any case be incomparably smaller than the risk of his system becoming impregnated with so insidious a poison as lead. Moreover, in permitting a workshop to be used as a dining-room there is greater chance of the file-cutter omitting to wash his hands and face before meals. The committee feel that this explanation of their views on this difficult point is demanded by the circumstances."

The above extract sets forth the latest views upon the question whether meals should be permitted in workshops. Similar arguments apply, of course, to match factories; but outside the operation of the Home Secretary's orders there are various employments that cannot be considered dangerous to health. It is in workshops where these harmless trades and industries are carried on that, governed by certain conditions, meals may be taken by the workers. The law, indeed, in limiting the hours of labor for a woman to twelve, makes this number also include a mealtime allowance of one and a half hour, and prescribes that one hour of this shall be spent before 3 p.m., either as a dinner hour or a breakfast half-hour with a dinner half-hour, or hour if there is no tea-time—some women beginning their day at 6 a.m. Further, the meal hours arranged must be posted up in the factories and regularly observed. But employers are under no compulsion to provide dinner rooms, and these conveniences are exceptional and rare as yet. Prior attention has been given by the women inspectors under the Home Office to questions of overcrowding and air-space, ventilation, dust and fumes, cleanliness, and other matters relating to sanitation, to which the notice of the local authorities was called. The various annual reports of the medical officers of health in the metropolis give much evidence that progress in sanitation is being made in numerous workshops, and that it has met with no opposition, but, on the contrary, has been helped by the co-operation of the occupiers. In districts where sanitary inspectors devote the whole of their time to factories and workshops favorable results have been forthcoming. When a workroom is first inspected it is measured, a report on it entered in a register, and a card issued to the proprietor indicating how many persons may be employed in it, the card to be hung in the room. Workshops of the kind are to be found all over London. For example, there are over 1,000 in Marylebone, employing nearly 6,000 people, of whom about 4,500 are dressmakers or seamstresses. In Islington there are upwards of 2,300 workrooms, in Kensington 600, in Holborn there is a largely increasing number, as many as 1,015 workrooms having been inspected in the district east of the Gray's Inn Road. In Shoreditch, Mile-End, Poplar, and other parts, vast improvements have been effected; and in Lambeth, at the time of the inspection, 500 workshops contained 863 workrooms, the number of people employed in them having been 1,331 men and boys and 1,689 women and girls. In 187 instances women only were engaged. Want of cleanliness, defective drainage, dampness, and overcrowding have been the drawbacks hitherto; but as these are being gradually removed the example of enlightened employers may be, it is hoped, followed, and wherever possible accommodation for meals furnished. Some of the best manufactories of Leicester, built on the American plan, can afford models to London, not only in the arrangement of the dining-halls, but also in the system of catering which is in daily operation for the benefit of the workers.—*Daily Telegraph*.

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NOTES AND COMMENTS.

Frequent showers have fallen during the past month, and in the lower North and Southern districts the season is generally fair to good, but in the upper North there has been very little rain, and anxiety is felt in many quarters as to the prospects of the coming season. A good soaking rain at an early date is urgently needed in this part of the colony. Seeding is nearly finished, but the lateness of the rains has caused a number of farmers to put in a less area than intended. The area put in with the seed and fertiliser drill shows a marked increase over last season.

Mr. W. A. Hargreaves, analyst to the Marine Board and Customs, has been gazetted as Agricultural Analyst. Analyses of fertilisers will be undertaken by Mr. Hargreaves for the fees prescribed in the Fertiliser Act Regulations, viz., 3s. for each determination when the sample is accompanied by a copy of the seller's guarantee. The fee to sellers is 10s. 6d. for each determination. Samples for analysis should be addressed "The Agricultural Analyst, Marine Board, Port Adelaide." About 6ozs. of fertilisers taken from a well mixed sample is sufficient to send for the purposes of analysis.

It is estimated that in the state of New York alone 150,000 tons of commercial fertilisers, costing about £900,000, are sold annually. Only one other state in America is a larger consumer, the immense demand in New York being due to the very extensive market gardening interests of the state.

Probably no other country is doing so much for the advancement of agricultural education as the United States of America. By provisions of the Morrill Acts of 1862 and 1890 (so named after their originator), 30,000 acres of land were set apart in each state for the establishment of colleges whose leading object was the teaching of the arts relating to agriculture. In addition, over £200,000 is annually voted by the national Government to meet expenses attending instruction in certain branches in these institutions. There are now sixty-six such institutions organised under the legislation mentioned, with a total annual revenue of £1,200,000, and staffs amounting to 2,000 persons, giving instruction to 30,000 students. Over £10,000,000 are represented in the permanent endowments, buildings, and equipment. In addition, about £600,000 is annually voted to the National Department of Agriculture.

The Conservator of Forests has issued his catalogue of trees for free distribution during the coming season. Three hundred and thirty-three thousand nine hundred and forty-one trees are available, being 100,000 more than the total distributed last year. Intending applicants should forward a stamp to the Forest Department for catalogue. Over four and a half million trees have been distributed by the department during the past seventeen years.

The reassuring reply given by the Commissioner of Crown Lands to the deputation which waited on him last month, to urge the necessity for preserving and enlarging our forest reserves, will be hailed with satisfaction by those who have the best interests of the country at heart. There always seems to be a desire, on the part of a few people, to take away all the good land reserved for forests to throw it open for cultivation purposes. One of the greatest mistakes made in this country has been the wholesale destruction of timber to satisfy the demand for land for wheat-growing, and unless remedial action is taken very soon timber for all purposes will, within a short time, be very scarce and expensive.

The *California Fruit Grower* says, "Gaunt famine is stalking through certain districts of Russia. One of the worst features of agricultural Russia is the deforestation of the country. The whole of Central Russia is practically denuded of trees, and this has been brought about in a little less than fifty years. The deforestation has affected the climate and reduced the snow and rainfalls. The Pacific Coast may profit by the lesson." [And so might Australasia, if the inhabitants would only use their powers of observation.—EDITOR, *Journal of Agriculture*.]

Professor W. R. Lazenby, Ohio, U.S.A., at the Thirty-second Annual Convention of the Ohio State Horticultural Society, said "Probably no state in the Union was supplied by nature (originally) with a more varied and generous covering of forest trees. For a little more than 100 years this magnificent forest area has been yielding to the demands of agriculture, manufactures, and commerce. At first these demands were legitimate, and in meeting them Ohio became one of the best agricultural states in the Union. It is a great stock, grain, milk, fruit, and truck-farming commonwealth. A state centrally located, and one where land can be cultivated as profitably almost as anywhere else. For the past years the total area of cleared land has increased at a marvellous rate; but the aggregate production has diminished. In other words, nine-tenths of the total available area of the state is producing very little more than three-fourths of the same did a few years ago."

In order to prevent the introduction into South Australia of any new insect pests, the Hon. Minister of Agriculture has ordered all plants or portions thereof introduced into the colony to be subjected to fumigation by means of hydrocyanic acid gas. From and after July 1 a small charge, sufficient to cover expenses, will be made on all plants so treated.

The General Secretary of the Agricultural Bureau has received an intimation from the West Australian Department of Agriculture that all citrus fruits sent to that colony from Port Adelaide must be accompanied by a certificate from the Inspector of Fruit to the effect that they have been grown in South Australia.

Experiments conducted by the New York Experiment Station have proved conclusively that the eggs of plant lice, as well as the insects themselves, are effectually destroyed by the fumigation with hydrocyanic acid gas. Nurserymen should thoroughly fumigate all fruit trees, but especially peaches, before sending them out to customers. The necessary apparatus for doing the work is not expensive, and the cost of the material for generating the gas is very little. The enactment of a law in force in many of the American states requiring all trees to be fumigated before leaving the nurseries would do much to prevent the spread of insect pests, and would not be expensive to the nursery-

In an address upon "Insects in Relation to the Farmer and Fruitgrower," delivered before a farmers' institute, at St. Catherine's, Ontario, Canada, M. Burrell said: "Nearly all our birds are insectivorous, and an incredible number of our pests are disposed of in this way. There should be a strong and persistent effort made by farmers and fruitgrowers to protect the birds. The crow is looked upon as an enemy by some, but wrongly. The United States Government recently went into the crow question. His life history was worked out, and the crops of 1,000 crows microscopically examined to ascertain the nature of his food supply all the year round. His economic status has thus been clearly defined, and the evidence went to prove his friendly and helpful relation to the agriculturist. His diet was largely wire worms, white grubs, and other insects. . . . I would except the English sparrow in my remarks. The case against him is clear, and he undoubtedly drives away swallow, blue bird, and other beneficial visitors."

Although the antiseptic properties of peat have long been known, it has remained until quite recently for European fruitgrowers to apply that knowledge for the preservation of fruit. It is not necessary to wrap the fruit in paper, but it is merely buried in peat, so that each fruit is separated from the rest, the peat of course, being dry. Hitherto grapes were cut with a piece of the cane attached to the stem of the bunch, the top end of the cane being sealed over with hot wax, and the other end inserted in a specially made flask having a handle by which it could be hung up. The flask was kept filled with water, and by this means the grapes could be kept good for three or four months. Now they can be packed in dry peat in the same way that Spanish grapes are packed in cork dust. Mr. James Wade, gardener to Mr. J. S. Reid, of Rostrevor, near Magill, has packed a lot of lemons in imported peat with a view to keeping them until summer. They have already been packed eight weeks, and are as fresh as they were when first packed. It is worthy of special mention that Mr. Reid's extensive plantation of oranges and lemons is almost perfectly free from scale and other insect pests; this splendid result being maintained by frequent sprayings with kerosine emulsion. Questioned as to whether it pays to spray so often, Mr. Wade replied that it does not pay to neglect spraying, and that the increased vigor and yielding capacity of the trees amply covers the labor and cost of the work.

All the best American and Canadian authorities agree that potatoes should not be hilled up. At the Cornell University Agricultural Experiment Station in 1897, the potato plot cultivated on the level yielded 325 bush. per acre against 288 bush. per acre from hilled rows, or 37 bush. per acre in favor of level cultivation. To prevent scab, many growers thoroughly wash the seed and soak it for ninety minutes in a solution of 1 oz. corrosive sublimate in 1 gall. hot water. A brown blight which seriously affects the leaves and spreads rapidly is occasioned by a parasitic fungus, necessitates three sprayings with Bordeaux mixture to prevent losses. Considerable increases in yields were secured from each additional cultivation of the growing crops, and also as a result from two additional sprayings with Bordeaux mixture.

The first human beings on this earth lived in a garden, and were completely happy until they had to leave it. Ever since then there seems to exist in all human beings more or less of a desire to return to the original state of existence. Farmers can make their wives and children more content to stay upon the farm by establishing a garden, where they can grow not only fruit and vegetables, but flowers and ornamental plants also. There are several farms in this colony where such gardens exist, and it is noteworthy that all the people upon such farms appear to be happy and prosperous. Neighbors for miles around are delighted to visit at such places, and are always heartily welcomed.

"He never could do anything that would stay done," said a Yankee respecting a really hard-working but thriftless farmer. "He was particularly neat in his work, and when he was mowing he would pick up any stone that lay in the way of the knives and pitch it behind him; and next year he would pitch the same stone behind him again, and so on till he died. He never seemed to get ahead."

In Cape Colony the colonists and natives are troubled with several serious pests for every one prevalent in Australia. One of their worst plagues comes every year in the form of clouds of locusts, which consume every green plant in the fields and gardens. The worst ravages are committed by these insects before they get wings to fly with, and they commence to destroy crops wholesale directly they emerge from the eggs. In Crete and similar countries the same trouble is annually experienced, and although hundreds of tons of eggs have been collected each year, and tons upon tons of minute "hoppers" caught in trenches, still there was but little impression made. Cape Colony appears at last to have solved the problem, and farmers can cope with the "voetgangers" (walking or wingless locusts), either by infecting them with a fungus disease, or by poisoning the herbage or laying poisoned bait where they congregate. The mixture consists of 2 lbs. arsenic, 8 ozs. washing soda, 25 lbs. brown sugar, and 30 galls. water. Boil the soda and arsenic for ten minutes in a kerosene tin; then pour it into a galvanized-iron bath with 30 galls. water, stir in the sugar, and use the liquid to saturate chaff, grass, chaffed maize, sorghum, or other matter that will be eaten by the locusts. They will flock from an area of several yards, attracted by the odor of the material.

THE PHYLLOXERA QUESTION.

BY ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

Paper read before the S.A. Vinegrowers' Association, May 31, 1899.

Gentlemen—On a previous occasion, about five years ago, I was given the opportunity of addressing you at some length on the phylloxera question. A general review of the whole subject was, at the time, the best treatment that circumstances appeared to suggest; and, in consequence, I dwelt on details of the life history of the insect, its methods of multiplication and spreading, closing with a reference to the most rational methods of treatment that had, in my opinion, become consecrated by the success of other countries. In many respects our position to-day is no more what it was five years ago, and, unless driven to it by the force of circumstances, I shall deem myself absolved from the necessity of going over ground that has been previously traversed. To those who are in need of further details I would suggest a perusal of my earlier paper, reproduced, with excellent illustrations, in the *Garden and Field*, June, 1894.

I have intimated the existence of a change in the position of vinegrowers. Let us throw into relief the differences that late years have brought in their train. In 1894 our area under bearing vines was comparatively small, but in old and new districts alike, flourishing young vineyards held out promises of fast approaching returns. Our yearly vintage oscillated around 1,000,000galls.; our export trade absorbed not more than 250,000galls. representing some £50,000; and duties on the distillation of spirits yielded the State an annual revenue not exceeding £7,000. The phylloxera existed, it is true, in Victoria and New South Wales, but we were under the impression that everything was being done to keep the pest in check, and in view of the comparative isolation of the centres of infection we entertained the hope that there was still before the old vineyards of the sister colonies a long period of prosperity, and it may be added that in consideration of the success with which, since 1875, the pest has been kept within bounds in a closely planted country such as Switzerland, such hopes were not unreasonable. Such then was our position when I first had occasion to refer to the subject. In what manner has it changed to-day? In the first place the importance of vinegrowing as a national industry has more than doubled. Our area under vines in full bearing has considerably increased. In spite of unfavorable seasons our yearly vintage now exceeds 2,000,000galls. Our exports have risen from 250,000galls. to from 500,000galls. to 600,000galls., representing over £100,000, and from our local stills the State reaps about £12,000 revenue. Such progress, on which you are to be heartily congratulated, should give you cause for unalloyed gratification were it not dimmed by an equally important change that has come over the phylloxera question. As early as 1896, whilst on a visit to some of the infested districts of Victoria and New South Wales, it was evident to me that either through apathy or want of appreciation of the danger, the pest was not being combated with all the vigor that was necessary, and I was driven to the conclusion that ere long the vine area of both colonies would in its entirety be infested. These views of mine I embodied in a report to the then Minister of Agriculture, the Hon. J. A. Cockburn, but as, to a certain extent, they animadverted on the actions of friendly neighbors, he did not think it expedient to publish them. In a great measure they have since been amply fulfilled, and with the pest at Rutherglen, the largest vinegrowing centre in the colonies, we must preforce look upon the whole of Victoria as infested, and further in both colonies I understand that the struggle is practically to be given

up and new vineyards to be raised on resistant stocks, creating thus on our unaffected borders a breeding place for the phylloxera. Such then is the position that we have to face—free as yet from the pest, we are nevertheless in danger of seeing it accidentally introduced amongst us at any moment. Let me now dwell upon those measures that a consideration for the safety of our vineyards should lead us to adopt. With intercolonial free trade looming on the horizon it seems hard to have to ask for any border restrictions, and yet it is not within our power to do otherwise. Any vine, or portion of vine, and any rooted plant grown within the neighborhood of vine roots, might introduce the pest into the colony; their importation over our borders from infested countries must therefore be strictly prohibited, and, further, every imported rooted plant should be accompanied by an official certificate to the effect that they had not been grown, say, within from 50yds. to 100yds. of vines. It is unfortunate that to a certain extent such restrictions should affect the business of others not interested in vinegrowing; but can an industry so important in its present returns, and so much more so in what the future has before it, be sacrificed without a struggle. But a few more years and we shall have 20,000 acres in full bearing, yielding, say, at least 200galls. to the acre, and representing as a contribution towards our agricultural revenue about £400,000, or about one-ninth of our total agricultural returns, which do not exceed 4½ millions sterling, including the important pastoral and wheat industries. And in time there is no reason why South Australia should not be able to boast of 100,000 acres of vines; and, further, every acre in full bearing represents, at a low estimate, the sinking of from £20 to £30. Are such interests to be ruthlessly sacrificed? Independently of the individual interests of vinegrowers, it appears to me that the community at large has equal interest in keeping the pest at bay, and if this can only be done by keeping our borders closed against the open introduction of sources of infection it is but little to ask those who will suffer some slight inconvenience from the restrictions to submit with a good grace.

Looking towards the inevitable future, when, in the course of events, we shall ourselves have become a phylloxera-infested country, it behoves us to come to some definite conclusion as to our subsequent methods of procedure. And here let me say, that I am in perfect agreement with the decisions arrived at by the delegates of our different districts assembled recently to discuss provisions for a new Phylloxera Bill. It has been agreed that the discovery of the phylloxera in any given spot should be the signal for the adoption of prompt and drastic measures of eradication. The Bill enters into no details as to the methods of treatment, but wisely leaves the matter to the discretion of the Phylloxera Board, who are to have full control over all such operations. As being, however, a question that admits of absolutely no other alternative, the quarantine regulations for infested spots receives categorical reference. These regulations, in the form they assumed in the old Bill have, I understand, given rise to strong opposition from small growers situated in the neighborhood of large cities, and whose vines are intermingled with fruit trees and other crops. It seems probable, however, that they have over rated the hardships to which they would become liable. In the first place the quarantine to a very great extent need only be temporary, and pending the complete destruction of the infested vines. Within a month's time of the first treatment, or thereabouts, it would, in my opinion, be unnecessary to further quarantine anything the marketable produce of which was borne above ground, such as fruit and some vegetables. In the case, however, of plants or portions of plants, such as roots or tubers, the saleable portion of which is placed below ground, it would, in my opinion, be almost absolutely necessary to extend the quarantine to a further twelvemonth. It cannot, however, be denied that these

regulations, however carefully applied, must occasionally become a source of temporary hardship to persons not wholly given to vinegrowing. It therefore appears to me that just as, in the case of vineyards uprooted for the public weal, it has been agreed that the owners receive compensation to the extent of the damage done them by the board, so the same principle, in strict justice, should a *fortiori* be extended to any damage whatsoever done to the property of the quarantined individual. The adoption of such a principle would, I am convinced, do much to facilitate the passing of the Bill.

As has been said above, the further details of treatment have been left to the discretion of the board. It is to be presumed that they will adopt alone such measures as have been proved most effective by the experience of other countries. In my earlier paper I indicated what, in my opinion, was the safest method to adopt. It may, however, be as well to repeat it here. First and foremost, not a vine within an affected vineyard should be spared; the whole area should be injected with carbon bisulphide to depths of 9in. to 12in. and at the rate of 5oz. to 6oz. to the square yard. This should be done before the vines are uprooted or the soil broken up, as under such conditions the action of the fumes is far more deadly and there is less danger of the escape of stray phylloxeras. Such a treatment would be sufficient to kill both vines and their parasites. In ten days or a fortnight's time the soil should be well trenched and the vines most carefully uprooted and burnt. The soil should then be well harrowed and firmly compressed with a heavy roller, and within a fortnight's or three weeks' interval be subjected to two other consecutive treatments with carbon bisulphide at the rate of 3oz. to the square yard. I have the fullest confidence that if such a treatment be strictly and efficiently carried out we shall be able if not absolutely to eradicate the pest, at least to keep it within bounds for a long period of time after its arrival here.

It is further provided that no vines shall be allowed to be planted on affected land until the board sees fit to allow it; and, in my opinion, such permission should not be granted until the pest has spread to such an extent as to render useless any further struggle against it. And here I take the opportunity of commenting on some controversial opinions that have recently been put forward in connection with this very question. It has been maintained by some that growers whose vineyards it may have been necessary to uproot should not receive any cash compensation, but merely be helped to reconstruct their vineyards on resistant stocks. In support of this view it has been argued that its adoption would remove from evil-minded persons any incentive to the surreptitious introduction of the pest in worthless vineyards, in order to earn a cash compensation; that remedial measures have generally proved of little avail against the phylloxera, and that in consequence it would be better policy to fall back immediately upon the resistant stocks; and that finally by maintaining intact our area under vines it would prevent the industry from receiving a serious check. A seductive proposal undoubtedly, and one that has caught on with those who have forgotten to look below the surface of things. Personally, however, I have no hesitation in stating that its adoption here would prove suicidal to the best interests of South Australian growers. Let it be remembered that these resistant stocks are the most favored hosts of the dangerous parasites; that both are indigenous of the country lying to the east of the Rocky Mountains, and that it is only the action of natural selection, working over periods of thousands of years, that has gradually inured the plants to the attacks of the insects; and that finally to place the former in phylloxera-infested country would be simply creating a breeding ground for the latter from which they would swarm out in millions, and in a very short space of time contaminate the whole of our vine area. I am perfectly willing,

and, I believe, well able, to meet any objections that can be raised to the methods I have recommended above, on the one hand, and on the other to controvert the advantages claimed for the immediate adoption of these resistant stocks. At present I can only touch upon such points, as have, in the course of conversation, become known to me, but I am prepared to deal with any others that may be raised in the sequel.

That compelling a man to replant his infested vineyard with resistant stock, *ipso facto*, removes any incentive to the surreptitious introduction of the phylloxera for purposes of personal gain, I do not think it necessary to dispute, but, if the Bill as amended be passed, in what way will it advantage a man to have his vineyard destroyed, if he receive compensation only to the extent of the damage done to him, not by the phylloxera, but by the board in the interests of the public? Given that his vineyard is infested with the phylloxera, its life is not worth three years' purchase, and under the circumstances how can such compensation as he may receive repay him for the total loss of his vineyard? If his vineyard can be proved to be absolutely worthless, not a penny compensation will he receive under the new Bill. It has been further alleged, and still in support of the resistant stock, that certain individuals might introduce the pest from motives of personal spite. If such brutes exist—and I can hardly bring myself to believe in their existence—I fail to see how absence of compensation and compulsory replanting on resistant stock is going to restrain their evil passions. And thus, it appears to me, this first argument falls to the ground.

Again, to state that treatments having for object the complete eradication of the pest have not in other countries given rise to satisfactory results, and that because the latter have been in the long run driven to the adoption of American vines, we must necessarily follow their example, is both misleading and inexact. It is conveniently forgotten that in the early days of its appearance in Europe, even after its discovery, the phylloxera had things very much its own way. The details of its life history, and the most effective methods of treatment that were subsequently discovered, came too late to check its progress, the multiplicity of the centres of infection precluding any idea of definitely stamping it out. I do not pretend that in any one country have they succeeded in completely eradicating the pest, but wherever the necessary treatments and the necessary precautions have been observed and adopted in time it has been, and is still being, kept in check. In Switzerland it was first discovered in 1875, in one of the Rothschilds' vineyards, and so complete does the eradication appear to have been that no signs of the pest were discovered until eleven years later, introduced, no doubt, from some other centre of infection; further, in this energetic and closely planted little country, eradication treatment still keeps the pest in check. In the Prussian provinces, where the insect appeared from the earliest days, they appear to have completely eradicated it, as no signs of it could be discovered in 1893. In Algeria for the last twenty years the progress of the insect has been insignificant, and have we not an equally convincing example nearer home? Both in Victoria and New South Wales the phylloxera has existed since 1875, I believe, and yet, in spite of somewhat careless treatment in recent years, only a portion of their territory is as yet affected. It is well enough for Mr. Dubois, the new Principal of the Rutherglen Viticultural College, to advocate, as he is reported to have done, the general adoption of American vines in Victoria, though even here, without any very definite idea of the extent to which the pest has been allowed to spread in the sister colony, I am inclined to question the wisdom of such a policy, for the present at all events; but our cases are by no means parallel. In Victoria the pest has got a firm hold of the country; here we

would be dealing with it in the initial stages of its appearance. I do not assert, in contradiction of the experience of other countries, that we shall be able to completely eradicate it by timely treatment, though neither do I deny the possibility of our being able in this respect to set an example to the world, coming as we do in the rear of the mistakes of others, but I do maintain that were the phylloxera to appear here to-morrow by prompt and energetic action we shall be able to protect the bulk of our vineyards for the next twenty and thirty years and more.

And finally it has been said that compensation in the exclusive form of help towards replanting on resistant stocks would serve the best interests of the industry. Many of my previous arguments go, I believe, towards proving the contrary. I will now go a step further and state it to be my emphatic opinion that the adoption of such a policy would damn the industry for the time being. Whose interest would it serve to introduce the pest? Who would benefit by such a form of compensation? Not the owners of strong healthy vineyards in full bearing, but those who owned nothing but what was old, useless and worn out, and who might hope to get new vineyards built for them at the expense of others. All future planting must of a necessity come to an end if it is to be an understood thing that on the first appearance of the phylloxera it is to be allowed to breed at liberty on American vines. Why go to the unnecessary expense of uprooting affected vines if others equally affected, but resistant, are to take their place? It was not without an object that in the earlier stages of my paper I quoted the recent progress of our viticultural industry. The greater part of our vines are young and healthy and but recently come into full bearing. Is the owner of a good healthy vineyard prepared to pay money that his neighbor, possibly the owner of a worn out old vineyard, be compensated for problematic losses, and become a source of perpetual danger to him and the whole country alike? Is the cost of bringing an acre of vines into usefulness so light a thing?

And yet a last word of warning. We may in time, it is true, be compelled to fall back on American stocks, but, independently of the phylloxera question, many reasons can be adduced in favor of the wisdom of deferring this questionable blessing. It is reckoned in the South of France that the introduction of American vines, without any appreciable change in the price of wines and labor, has reduced the profit per acre from £10 to £2 or £3. This may be traced to several causes: in the first place, owing to want of perfect adaptation between stock and scion the average life of the vineyard is reduced from fifty to twenty or twenty-five years, consequently the money sunk in original outlay has to be recovered in a shorter space of time. The cost of cultivation is augmented by the constant earthing and unearthing of the plants for the suppression of root-lets appearing on the scions, the process of planting becomes more expensive, the plants are more difficult in their adaption to the different types of soil, &c. And, finally, those dread diseases—downy mildew and black rot—will, as was the case in France, be introduced here and still further burden the debit side of the balance-sheet. In conclusion, the introduction of American vines is far from advisable at present, and when, in last resort, they are adopted they will inevitably considerably augment the cost of cultivation. My advice on the appearance of the phylloxera in any given district will be to uproot every American vine that may be found there at the time.

I may be excused for dwelling at perhaps unnecessary length on this last aspect of the question, but we have of late been so flooded with contradictory views on the subject that I have thought it necessary to place the question in as clear a light as possible. I trust that I may not have failed in my object.

PROTECTING PEACHES FROM FROST.

In many of the cooler and later districts of the colony peaches suffer considerably from late frosts, and often the greater part of the blossoms fail to set, or the newly set peaches drop. The same difficulty is experienced in America, the trouble being so severe as to cause an almost total loss of fruit in some seasons. Various methods have been tried to prevent this injury, and the most satisfactory results have been obtained from whitewashing. It is, of course, well known that white is the best reflector of heat, while purple and black are the two colors which absorb the heat most readily. The bearing twigs of the peach are mostly of a dark-purple, and they very readily absorb the heat rays of the sun in the late winter or early spring, causing the fruit buds to develop prematurely, and thereby exposing them to the effects of late frosts. Careful experiments made at the Missouri Experiment Station during the past few years have proved that there is a considerable variation between the temperature of the peach twigs in their natural condition and those that have been whitewashed. The subject was thoroughly investigated by the officers of the station, and it has been found that a coat of whitewash applied to the trees in early winter by means of a spray-pump, and renewed as often as it is washed off, has proved absolutely effective in retarding the development of the fruit buds and the blooming of the trees for from seven to ten days, and in several instances unwashed trees were injured by late frosts, while the whitewashed trees escaped injury.

As thin whitewash can be very cheaply applied to the trees by means of the spray-pump, it would be well worth trying by growers in districts where the retarding of blooming for a week or more would be an advantage on account of the liability to frost. The whitewashing would, of course, have to be renewed several times, and should also prove of considerable assistance in checking the ravages of the peach aphid by destroying the early broods.

FRUIT TREE PRUNING.—No. 3.

By GEORGE QUINN, INSPECTOR OF FRUIT.

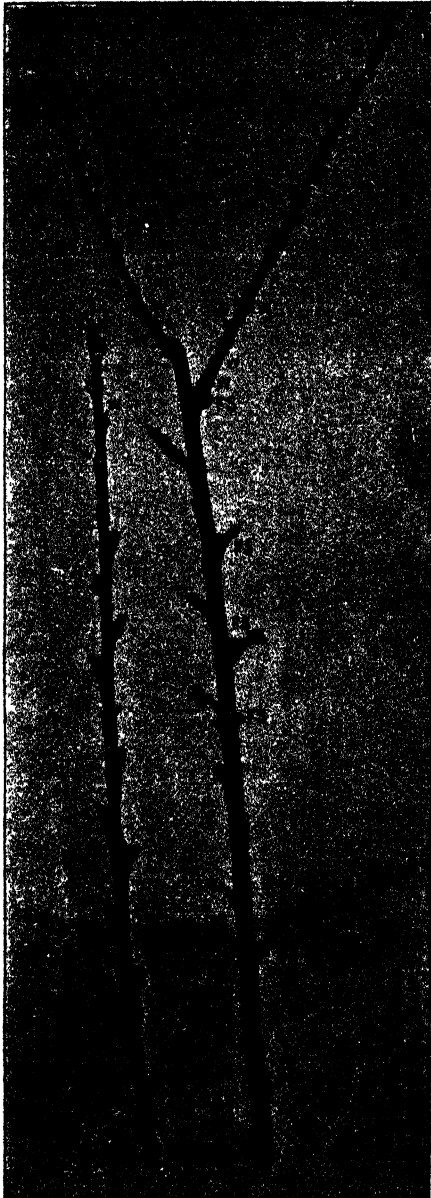
We have now arrived at the stage when the treatment of each tree must differ according to its kind, and the pruner enters upon a new phase of the subject, viz., *pruning to promote fruit-production*. Whilst the pruner is conducting this work he must always bear in mind that its successful accomplishment depends greatly upon the proper maintenance of the good health and growth of leading shoots; consequently, to maintain this and the proper shape of the tree, these portions must receive careful attention.

Naturally as the tree reaches maturity and becomes furnished with many laterals, and produces full crops of fruit, the growths upon these leading shoots—on most sorts of trees—will become less from year to year, until pruning practically ceases as far as they are concerned.

Before entering upon the work of pruning for the encouragement of the production of high-grade fruit, the pruner should not only learn to distinguish the flower buds, but should be thoroughly conversant with the portions of each kind of fruit tree upon which these flower buds are borne. He should know the age of the shoots upon which flower buds are developed; and should try to discover the positions and ages of those shoots which produce flowers that *set and carry fruits to maturity*.

With a view to assisting the beginner to readily grasp these essential points, I have photographed typical fruit-bearing shoots from peach, apricot, plum, cherry, quince, almond, pear, and apple trees, and will trace, in detail, the respective development of each.

In Plate XI. two shoots from a peach tree are shown. Fig. 1 was produced last summer. It has been severed about 6in. above the two-year-old wood. The clusters, consisting of three buds, are seen at regular intervals along it. If these buds are examined closely, they will, in most instances, consist of two plump ones pointing upwards and outwards from their bases. Between these,



and lying closely pressed against the shoot, a flat pointed bud may be seen. If, as the season progresses towards spring time, similar shoots are examined, the side buds will have swollen greatly, and later will have expanded as flowers. The small flat centre bud will either put out leaves or perish. If we follow this shoot up we will see, as its terminal point is approached, two of these small flat growing buds placed singly at points marked W. The shoot terminates in a cluster of buds, in the centre of which a sharp pointed growing bud is located under the Fig. 1. Twelve months ago Fig. 2 was identical in appearance with Fig. 1 at present, with the exception that it is shown to a fuller length. Near the base of Fig. 2, at places marked W, three small buds are seen, and the lower part of Fig. 1 was similarly supplied. These are wood buds that made only a feeble attempt to grow, owing to the topmost shoots and fruits absorbing most sap.

A little further up there is above F S a short spur-like growth, upon which several buds are visible. Situated immediately alongside, at F S, a short hard dry stub adheres to the shoot. This is the dead stalk of a peach fruit. No doubt three buds were developed here last year, and in the struggle for existence one flower bud perished. The other set and matured a peach, absorbing much sap thereby, so that the flat wood bud only formed the small bud-crowned spur-like twig we see at F S. On examining the buds we will find they are all flower buds: consequently this small twig may fruit once, but cannot continue its existence longer, as it has no wood bud from which leaf-growth could emerge.

If we follow up the two-year-old shoot we find this partly developed

PLATE XI.—PEACH.

wood growth and fruit scar, with its accompanying short spur-like twig, repeated throughout, until the terminating shoots are reached. Comparing these two terminal shoots with Fig. 1, they will be found to coincide in almost every particular, on a shorter scale. Near the base of each, at W, the small flat wood buds are seen; then some double and single flower buds; and near the upper ends, at W, and at the topmost point, at W, wood buds are again met. Under ordinary circumstances the flower buds on these two shoots of only one year's growth would carry fruit to maturity, and would cause the obliteration of the short spur-like growths on two-year-old wood. It is thus clearly shown that the peach can only be relied upon to mature fruits from buds formed

on shoots one year old—that is, formed during the previous summer; consequently the grower should endeavor to produce each year a sufficient quantity of new shoots. It is also seen that the only reliable buds for the extension of lateral shoots are the single wood buds usually found at the base, and near or on the terminal point.

Five shoots cut from an apricot tree are illustrated in Plate XII. Fig. 1 is a spur made last summer. At its base the positions of several small wood buds are shown only as scars. Along it, at irregular intervals, buds are shown in clusters of three. Generally these consist of two flower buds, with a leaf bud between them much smaller in size. In this respect the apricot buds resemble the peach; but a singular difference is that, whereas each flower and wood bud is

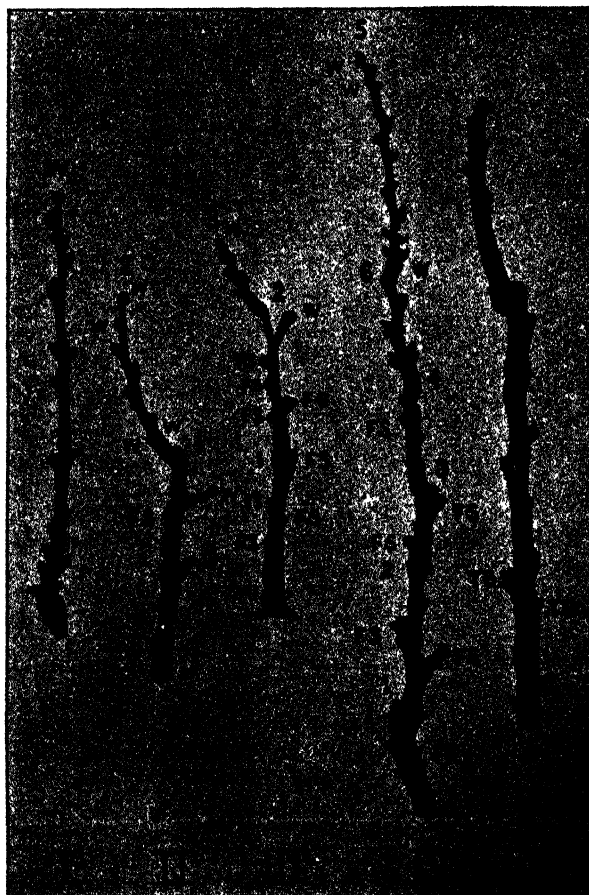


PLATE XII.—APRICOT.

developed in the axil of a leaf, with the apricot only one leaf is developed below each cluster of buds. If the shoot of Fig. 1 is traced to its summit, a solitary wood bud will be found at W. Fig. 2 represents a shoot of two seasons' growth. Between its base and 1 the wood is two years old. It has carried fruit, as shown by a scar at F S. Two other fruits were borne below, but the photograph does not show the scars. The spur was pruned at I. Two small side shoots are seen on this wood, representing short shoots sent out from

wood buds located between two flower buds. Each of these carry one or two weakly flower buds, and are each topped at W by a wood bud. In similar short shoots on the peach no wood or growing buds are found. It is, therefore, certain that these small shoots may be of value for a more lengthy period than similar ones upon the peach.

From 1 to 2 on Fig. 2 the growth is almost identical with that upon Fig. 1,

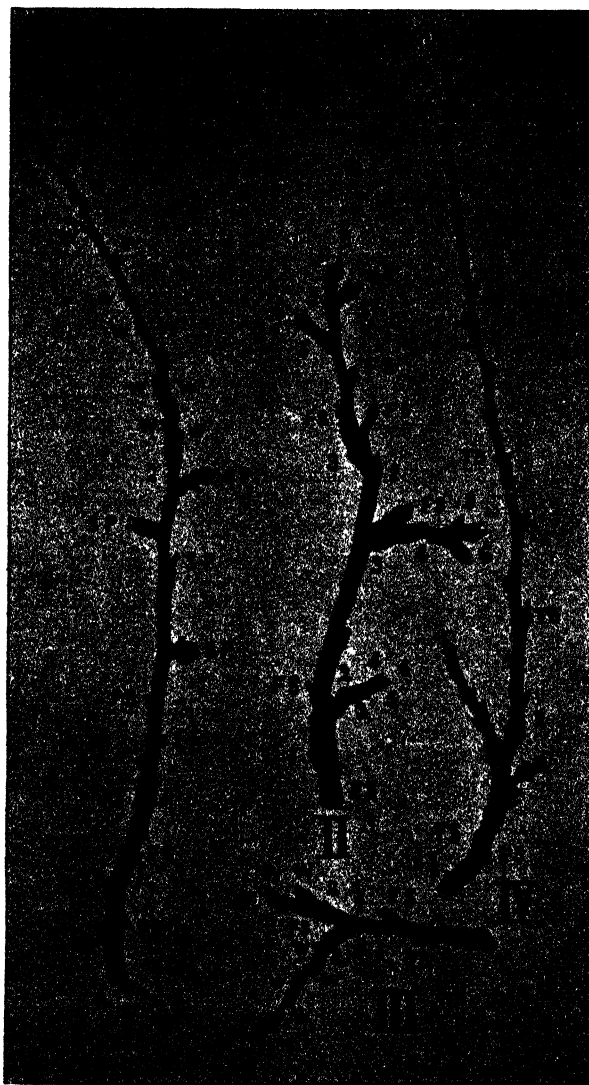


PLATE XIII.—PLUM.

and is of the same age. Near its base and at its apex isolated wood buds, marked W, are found, as distinct from the mixed clusters of flower and leaf buds.

Fig. 3 shows a shoot carrying three seasons' growths. From its base to 1 represents the growth made three seasons ago. The following season it bore fruits at F S, and not being pruned, its terminal wood grew on to 2. Midway along this growth of the second year it carried fruits at F S, the scars being plainly visible now. Near the apex of this second year's growth two wood buds were developed, and during last season—the third—these two buds gave rise to shoots of a similar character terminating at W in wood buds, and possessing flower buds lower down.

Fig. 4 is a lateral shoot with five seasons' growth upon it. From its base to 1 was made during its first year. It then lost its point, apparently by an accident. Next year it bore a fruit at F S and grew on to 2, terminating in a wood bud.

The following year it extended to 3, bore two fruits at F S, and formed the usual terminal wood bud. Being pruned next winter, this terminal wood bud was removed, and a lower one took up the course of growth to 4 in the fourth summer. Again fruits were borne at F S. During the fifth season

the terminal wood bud lengthened to 6, and receiving a fresh impetus—probably from midsummer rains—a fresh growth was made to 5. From 6 to 5 the growth is identical again with that of Fig. 1.

Why can we tell that each of these stages represents a year's growth? In the first place, the bark varies in color, and, secondly, the fruit scars left from each season's crop differ in appearance.

Figs. 1, 2, 3, 4 are all lateral spur growths. Fig. 5 is a piece of a leading shoot made last year. On it are developed at T B the clusters of triple buds, as on the laterals; but although the flower buds expand into blooms, it is rarely they set or mature fruits. On these shoots the wood buds take precedence, forming either lateral spurs and other leading shoots, or they remain dormant. In the clusters of mixed buds on the lateral the flower buds take precedence, often to the extermination of the central wood bud.

It will thus be seen that the apricot forms flower buds on spurs one year old. These spurs under proper treatment lengthen from year to year, and on them fruits mature. Flower buds are also developed on leading shoots, but they are unreliable for fruit. It will also be seen that the proper and reliable bud to continue the growth of the lateral is the isolated or single wood bud, as distinguished from those in the mixed clusters.

In Plate XIII. various growths cut from a plum tree are figured. Fig. 1 is a lateral shoot of three seasons' growth. Three summers ago it grew from its base to 1, and formed a number of buds in the axils of the leaves upon its length, terminating in a wood bud. The following season it lengthened from 1 to 2, and these axillary buds on the first year's growth formed up into short, plump little stubs, each surmounted by several flower buds. Between 1 and 2 axillary buds were again formed. Next summer the terminal bud grew on to 3, forming axillary buds along its entire length from 2, and pushing out four short spurs at S P; at the same time flowers expanded and fruits set or matured at each spot marked F S. Next spring the clusters of small sharp-pointed flower buds on the short spurs S P will produce flowers and fruit, and the leaf buds at each terminal grow on again, and some of the wood buds between 2 and 3 develop into spurs.

Fig. 2 is a six-year-old lateral. It grew to 1 the first year. The second saw a much longer growth. The pruner then shortened it to 2, and the next season several spurs were developed, and only a very short top growth made to 3. While below 1 a fruit at F S was borne. The following season a longer top growth reached 4, and a corresponding lengthening of the spurs took place, as marked 4 on each. Several fruits were borne at F S between 1 and 2. Next season a very short addition was made to each spur, indicated at 5 respectively. Again several fruit scars are visible, but it is doubtful if they matured. Next—that is last—year the spurs all lengthened to points marked 6, and fruits matured at F S between 4 and 5.

A typical three-year-old lateral spur is shown at Fig. 3. Last year this bore fruits at F S on two-year old wood, and on wood of the previous year. Fig. 4 indicates how this is possible by the clusters of buds, as shown at T B. In these cases flower and wood buds are associated at the same axillary point as with the peach and apricot, and, like the latter, occasionally set fruit. On the plum the central wood bud in the cluster is largest. Some of the Japanese plums bear more consistently on wood of the previous year, but with European varieties the exceptions only prove the rule that the plum forms flower buds in clusters, usually and preferably upon spurs two or more years old, and that these spurs are provided with terminal leaf buds which enable them to lengthen from year to year.

Plate XIV. illustrates a spur and a lateral shoot cut from a sweet cherry tree. On Fig. 1 the concentric rings of scars clearly show it has produced

seven sets of annual growths, and has probably borne flowers each time. It is a true spur, as it terminates each year's growth in a strong wood bud, thus ensuring its development from year to year. If the figures at various stages along its length are examined, they will indicate where side buds made one year developed the next into little clusters of buds (usually five or more in number) set on a short stalk, the central bud being a leaf bud. The following year these flower buds expand and form fruits, while the leaf bud only develops leaves, apparently to assist to nourish the fruits. When the ripe fruit is pulled or falls, these miniature spur-like growths perish, and leave only a scar. This process is seen again on Fig. 2, which is four years old. Near its base a central leaf bud has survived and tried to form a spur, but its efforts would doubtlessly



PLATE XIV.—CHERRY.

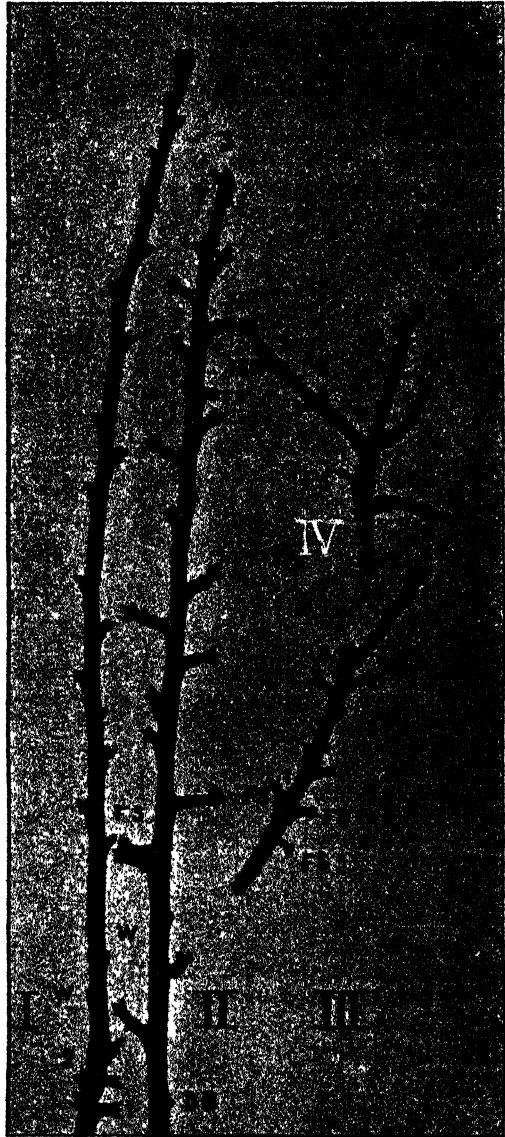


PLATE XV.—ALMOND.

have ended in weakness and death. The growth from 3 to 4 has started away strongly, and might have become a main shoot owing to being favorably located on the tree respecting an upper position and good light. A shoot like this may have gained strength, and made lengthy growths supplied with widely

separated nodes, the buds at which could and would each develop into spurs similar to Fig. 1.

Four typical growths taken from an almond tree are depicted on Plate XV. Fig. 1 is a shoot of last year, from 2 to its apex at 1. Near its base, at W, dormant flat single buds are seen. These are wood buds. Following it up, buds in clusters of three and four are regularly noted—compare with peach and apricot; at its apex a cluster of buds is formed, apparently on the same level. There are more wood buds than bloom buds in this cluster, and they occupy the central and outer positions. On the peach terminal only one wood bud is found, surrounded by flower buds. The wood buds on the almond do not lie closely against the shoot, but point away at the same angle as the flower buds.



PLATE XVI.—PEAR.

matured below 1 at F S. Last season the terminal point at 4 was reached, and the usual buds and spurs formed and lengthened. Next season at 2 fruits might have set and at 3 blooms expand, but their chances of setting fruit are somewhat problematical. Fig. 4 is a typical old branching spur, and I leave my readers to work out the attached figures.

The almond is often compared with the peach, but Figs. 1 and 2 show that, although the arrangement of the flower buds is practically identical with those on the peach, the setting and maturing of its fruit is more closely allied with the plum. Again, in the triple clusters of buds on the peach on annual growths, the flower buds persist to the early extinction of the wood buds. On the almond this is reversed, as seen in the lengthening spurs on Fig. 2. Owing to

These wood buds are prominent, though not larger, as in the case of the plum, or more insignificant, as on the peach, but only slightly smaller than the flower buds.

Next spring these flower buds will burst into bloom. The blooms, however, will fall infertile, and the wood buds will grow into short spurs like those seen at the bottom, below 2 on this Fig. 1.

These little spurs terminate in a cluster of buds, in the centre of which each carries a strong wood bud, thus showing them to be true spurs, capable of lengthening from year to year. Fig. 2 is a shoot carrying three years' growth. It grew to 1 the first year, and looked as Fig. 1 does now. The second year its length reached 2—a couple of inches only—but it sent out spurs along its entire length. [Compare spurs at base of Fig. 1.] Last year it only increased its length by lin., partly owing to its growing point prematurely dying. At F S along this shoot almonds were matured last year, and left fruit scars similar to those on the peach, but more prominent.

Next spring it will bloom upon the spurs, and, as these are now lengthening, we can pass to Fig. 3. Here, again, all we have just recounted is repeated. The first year 1 was reached, and flower and wood buds set; next season a short extension to 2 followed; the following season a little longer growth was added to 3, and fruits were

the death of many buds on the spurs as they assume a branching habit (see Fig. 4), it will be seen that a regular supply of young spurs should be sought by stimulating the formation of a few shoots like Fig. 1 during each year.

An annual shoot at Fig. 1 and a six-year-old spur at Fig. 2 of a pear tree are shown on Plate XVI. The increased development of the buds as they take

higher positions is readily detected on Fig. 1. About half a dozen would become fruit spurs, while the three that are closely associated almost on the same level would struggle for superiority, and thus form that triple branch starting from a knob of enlarged tissue so frequently seen on young unpruned pear trees. Fig. 2 has had one season's growth removed, and where 1 is seen the spur is actually wood of the second season's growth from a bud similar to one of those near the top of Fig. 1.

From 1 it grew to B L, where flowers were borne. These, like most first blooms on spurs of the pear, failed to set, and a pair of side wood buds at the base of the flower stalk grew out and formed the fork terminating at 2. The upper growing bud absorbed much sap, and formed another flower bud at its apex F S. The lower one only grew to 3 during the following summer. A pear was set at F S, and again the base buds grew. Three started this time, but one is left sadly behind. This fruit did not mature; consequently the resulting spurs grew strongly to 3. On the left-hand growth of this fork a wood bud formed, but on its partner's point



PLATE XVII.—APPLE.

a flower bud again set, and a pear matured at F S.

The left hand shoot grew to F L while this pear was developing, and set a flower bud. Meanwhile the pear was growing on the right-hand shoot, and from its base three buds again started and grew to 4. On the outer right-hand shoot a flower bud again set. Last summer this opened and the flowers fell infertile at B L, and two short stubby growths emerged at its base. The left-hand

division formed a flower bud at F B, which would have bloomed in the coming spring. At the same time the left-hand straight growth on the spur grew to 5 and set a flower bud at F B, which would also have bloomed next spring. The lower branch of the spur received some injury past 3 and made but trifling

growths afterwards, but it is alive and has possibilities should the pruner desire to shorten the spur back towards its source of sap supply. The study of this spur teaches us that on its branches a fairly regular system of alternative development of fruit and wood buds is maintained, as the stouter one each year carried the flower buds.

Plate XVII.—Here we figure three shoots of an apple tree. Owing to an error in arranging my specimens, I have photographed them in reversed positions.

Fig. 3 is an annual leading shoot on a young tree. The closely folded wood buds are noted along its entire length. At its tip there are three wood buds; one each at W. The growth coming from these next year would be almost precisely the same as described in the pear. A crotch with three prongs would be formed, and a weak spot contracted, to the danger of the future growths to be made above them.

Fig. 2 is a typical lateral from an apple with a willowy habit. The piece shown is only two years old, but a couple of seasons' growth of it were left upon the tree. Two plump flower buds are formed at F, and above them two wood buds at



PLATE XVIII.—QUINCE.

W. A bunch of blossoms opened at F L S last year, but no fruits set. A base bud started away at once and grew to F L. At its top a flower bud formed, and below two wood buds. This is all very weakly, and should be severed at W below on two-year-old wood.

Fig. 1. is a typical spur from the celebrated Cleopatra apple. The first year's existence of this in bud form ended in it appearing like the small stub W, on the left-hand side, near the top of Fig. 3. Next year it grew to F S, and matured a flower bud there. The following summer an apple matured at F S, and three wood buds started at the base of the fruit stalk. The left side bud grew to 2, and its point died back. The lower bud grew to 2, and set a weakly flower bud. Next spring this opened and fell infertile, and the base bud grew on to 3, where a wood bud formed. Meanwhile the left-hand shoot lengthened to 3, and, its point being injured, two side buds formed into flower buds, and would have opened next spring. Here we have illustrated the alternate bearing principle, as seen in the pear, and the stoutest growth carrying the flower buds. There are various other principles, such as the undue lengthening of laterals and waste of buds; but I intend touching more fully on these when dealing with each specific kind of fruit tree at a later period.

Two shoots of a quince tree are illustrated by Plate XVIII. Fig. 2 is the typical water shoot—a shoot coming directly from wood several years old—well known to all growers who have pruned quinces severely. It has no flower buds upon it, and it would take a number of years to induce it to form them. Fig. 1 is the ordinary fruit-bearing growth of the quince tree. The base of our illustration shows where it was cut from older growth, and the figures only apply to the growth upon this particular portion. The first year it grew beyond 1, and, as is peculiar to the quince, the young wood point died back to 1. Next season two side buds grew, and formed flower buds at F F, respectively, opposite 2, 2. These blooms failed to set fruits, and the left-hand side shoot sent out two growths to 3, 3, maturing a flower bud on the lower one at 3. The lower original shoot also attempted a similar act, but one perished in the attempt (near F'), and the other extended to 3, where it also set a flower bud at 3. The left-hand original shoot now has two growths forming one fork, and the following year (that is, last season) they again branched and lengthened, respectively, to 4. The erect one branched owing to the death of its terminal twig, and the other owing to the formation of a flower bud. At F I, a flower bud is formed on two, and at Q a quince was matured last season, leaving the indications of further sub-division at buds marked S. Last season the lower original growth matured a quince at Q, and the usual buds indicate future growth.

In this we see a somewhat close resemblance to the alternate fruiting of the apple and pear on the stoutest branches of the spurs, no branch apparently carrying a fruit to maturity until it is in sturdy condition. The flower buds of the quince are formed singly, almost on a level with a growing bud, and the pair appear as a slightly broadened flat club-like termination. The flower buds are set terminally on their own annual shoot; therefore the sub-divisions and increased length of the spurs must be lateral and not terminal. (Refer to apple and peach, and then to almond, peach and cherry.)

(To be continued.)

AGRICULTURAL COLLEGES.—The total expenditure on the Ontario Agricultural College and Experiment Farm is £16,000 per annum, and the revenue £4,600—a net cost to the State of £11,400. In 1898 the roll of students reached 333, of whom 223 were in the regular course, and 110 in the dairy course. The visitors to the college and farm totalled over 30,000 for the year. Many of the American states spend from £14,000 to £30,000 per annum on their agricultural colleges and similar institutions. The total expenditure on the Roseworthy College and Farm is under £5,000 per annum, and yet there are a few people in South Australia who would decrease the amount if they had the power.

ORCHARD NOTES FOR JUNE.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

The ploughing of the orchard should not be postponed any longer if the grower is desirous of catching and retaining abundance of moisture in the subsoil. In localities receiving a very heavy annual rainfall it may be prudent to plough the soil up to the trees, leaving an open furrow down the centre. Even in these wet districts, if the subsoil is well drained—either naturally or artificially—the ordinary method of leaving the open furrow near the trees may be practised without any risk.

In some orchards in the eastern colonies a plough with moveable handles and head connections may be seen. When the furrows are being turned near the tree stems these portions are set over, and the furrows may thus be made within a few inches of the stem, while the horses and ploughmen are moving in a parallel line several feet further out. In one well kept orchard I recently saw one of these working among trees grown on the short-stemmed principle advocated in this journal, and the result showed conclusively that no impediment was put in the way of thorough cultivation.

The preparation of new ground for planting could be undertaken now, as the rains will have penetrated into the subsoil more or less, and subsoil ploughing will be rendered an easier matter.

Every season confirms the belief in the need for more thorough preparation of land prior to planting. Chief among the phases of preparation I would place draining. The object of draining, as commonly understood, is to carry water off the ground, but its chief object here is to conduct the water in and through the soil; for where water passes freely air will follow, and root action is established. This practice enables the water to keep in motion, and no such thing as super-saturation is possible. Moving water is warm and wholesome, consequently trees—more particularly those belonging to the citrus family—would be largely benefited and enabled to obtain a better root hold on the soil.

Slowly dissolving manures, bonedust or meal, refuse from slaughter yards, etc., should be worked into the soil now if the grower hopes to receive any benefit during the coming season.

The pruning of plums, almonds, and apricots will proceed during this month. In the formation of young trees the illustrations and information given in the two preceding issues (April and May) can be followed without fear, but in the treatment of older trees each will require separate treatment. If the grower intends to keep his apricot trees within reachable limits it will not be wise to leave more than about 12in. of annual growth upon the leading shoots, and care must be exercised in cutting the spurs.

In no case cut above clustered buds. If the spur is short, say, not more than 6in. long, do not cut it at all. If longer it may be shortened back, *always over a wood bud* (see illustrations in this month's article on pruning).

Plum trees send out spurs fairly consistently along their shoots, consequently after the tree is shaped, a much greater length should be retained of the annual growth. The old spurs require little pruning beyond shortening some that are unduly long, or removing very impoverished ones entirely. Almonds should have old distorted spurs removed, and the trees excited into fairly active growth by shortening in a few large shoots each season, to cause the development of others upon which new spurs will form (see illustration of almond in this issue).

The planting of all kinds of deciduous trees can be safely accomplished, although earlier plantings are preferable.

The harvesting of citrus fruits is now under way, and great care should be exercised in gathering the fruits, more particularly if they are to be sent to distant markets. The fruits should be cut leaving a piece of the fruit stalk attached to each.

Fruits prior to being packed should be wilted for a few days in an open shed to toughen the skins. The fruits then may be packed sufficiently tight to prevent any injury by shaking and friction.

Experience has shown that not much is to be gained by dressings of Bordeaux mixture being applied in mid-winter, consequently this practice should be postponed until later on.

The time is opportune, as slackness of work permits, to clean up all apple, pear, and quince trees, and others growing near them, to destroy hibernating larvæ of codlin moth. In pruning old trees all the broken and split ends of branches should be cut out smoothly to assist in preventing the harboring of this pest. All bandages should be removed and disinfected by being dipped in boiling water for ten minutes. They could, if sound, be afterwards dried and stored for future use.

No time should be lost in planting strawberries, but rather than set the plants out in poor or improperly prepared soil it would be better to defer the planting till some future time.

Growers in whose gardens the curculio beetle has been destructive should throw the soil near the trees up roughly during the winter, and if nothing which they will injure is growing near by, put fowls and ducks in, as the grubs which are developed in the ground would then be more readily reached and devoured.

NOTES ON VEGETABLE-GROWING FOR JUNE.

By GEORGE QUINN.

Vegetables are now growing freely and every effort should be made to maintain their succulent condition. Most growing crops are benefited by a light sprinkling of some quickly dissolving manure spread along the rows and hoed or forked in lightly. Superphosphates, sulphate of ammonia, and potash, either as sulphate or muriate, supply all that the plants may require in this direction, but the grower can best satisfy his individual case by testing them.

Cabbage, cauliflower, broccoli, leek, onion, lettuce, Brussels sprouts will still be transplanted, and successional sowings made to continue this work later on. Sowings should be made in drills of carrot, parsnip, onion, Swede turnip, ordinary turnip, broad beans, red and silver beets, prickly spinach, and in warm soils peas can be sown with advantage. In heavy wet soils these latter will not make much headway for a month or two, and are very subject to disease.

Former sowings of the above-named vegetables should be rigorously thinned if a good germination has been obtained. Each carrot and parsnip should have at least three inches square of space in which to develop, as one good plump root is better than two mis-shapen thin ones. Sow small plots of cress and radish for salad purposes.

Celery must be earthed up constantly if perfectly blanched stalks are desired.

The preparation of soil and the planting of asparagus beds should be put in hand. The ground must be deeply trenched and enriched with manure—well rotted. The plants should be set with the crowns three or four inches below the surface and the roots spread around with a slightly downward position. The surface of the bed may then be dressed with good rotten manure, into which a dressing of common salt is added. Five feet is the width usually allotted to the beds, and two rows are planted therein, allowing at least 30in. between the rows, and about 18in. plant to plant in the rows. Old asparagus

beds should have all the yellow ripened stems cut away before any seeds fall. The surfaces could then be top dressed with old manure, and about $\frac{1}{2}$ lb. salt to each square yard sprinkled over it.

The preparation of ground for planting rhubarb is almost identical with the requirements of asparagus, with this exception, the salt is omitted. Rhubarb plants are usually set 30 in. apart. No grower should be without a certain number of plants of Topp's Winter Growing variety.

CULTIVATION OF WILLOWS FOR BASKET RODS.

The most suitable soil for the cultivation of osiers or basket willows is a deep, moist, but well drained soil. It should be low and level, and, if possible, situated so that it can be irrigated during the dry weather. While the willows may grow on almost any soil, dry exposed ground, or land covered with standing water, or wet, badly drained soils are not suitable for growing them for commercial purposes. Rich, soft hollows in moist situations are very suitable, but effective draining is a necessity. Thorough preparation of the land is necessary before planting, the construction of drains being the first step. The drains must be of a permanent character, either open or built up at the sides, as the roots of the willows will penetrate the interstices of rubble and similar walls and fill up the drains. With open drains the roots must be cleaned out once or twice a year to allow free movement of the water.

The varieties most suitable for basket-work are *Salix viminalis*, *S. rubra*, *S. Forbyana*, *S. decipens*, and *S. stipularis*; the first being far the best. Plantings are made from truncheons of the previous season's wood for preference. Shoots of one year old taken from the under end of well-ripened shoots of good size, or two-year-old wood may be used. The truncheons should be 12 in. to 16 in. long, and a vigorous shoot will provide two or three plants. For basket or wicker work osiers should be planted about 18 in. to 2 ft. apart. Closer planting may be made; but in this case every other plant will require to be removed at the end of five or six years, or they will become too crowded. The plantation must be kept hoed and free from weeds. From the first year of producing a crop of twigs the stools must be carefully attended to each year, to keep them clear of rotten stumps, and to prevent overcrowding of shoots at the bottom. When these become too numerous they should be thinned out, leaving only sufficient to make vigorous growth, and those left cut down to two buds. A rod 6 ft. to 8 ft. in length is of more commercial value than two or three rods half that length. The proper season for thinning and cutting is in the autumn, as the dormant buds at the base of the shoots which are removed will swell during the winter, and probably start growth with the warm weather; whereas, if the cutting is left till spring, these buds will remain undeveloped. The shoots should not be cut until the second autumn after planting, as the longer they remain uncut the stronger becomes the shoot. By the third autumn the crop will be of considerable value.

The rods are cut immediately after the fall of the leaves, tied in bundles, and if not to be used green, *i.e.*, with the bark on, the bundles are set up on end in 3 in. or 4 in. of water during the winter and spring, by which time they are ready to be peeled. The operation of peeling is very simply and easily performed.

VALUE OF FORESTS.—Professor W. L. Jackson, of the California University, says, "The value of California's forest is greater than the value of all her gold mines, all her orchards, and all her vineyards. Their wise conservation means water for agriculture, perfect protection against drought, and power for manufacturing in every village and town throughout the state."

CONSERVING SOIL MOISTURE.

At the Ontario (Canada) Agricultural College, during summer of 1897, J. B. Reynolds, B.A., Professor of Physics and English, set apart two plots, each one rod square, for the purpose of determining what effect is produced by keeping the surface loose and finely broken to a depth of 2in. In May 17th, samples were taken from each plot to a depth of 3ft.; in June, thirteen similar samples were taken; and in July, nine. In May, the average temperature was 54·3° F., and rainfall 2·02in.; in June, 60° F., and 3·36in.; and July, 69°, and 1·33in. Plot A was loosened 2in. deep, and plot B left untouched, except as regards the taking of test samples. The results showed—

Per Cent. Moisture in the Soil.

	May			June			July.		
	1st ft.	2nd ft.	3rd ft.	1st ft.	2nd ft.	3rd ft.	1st ft.	2nd ft.	3rd ft.
Plot A	18·6	19·9	17·7	18·3	20·1	17·4	16·7	18·8	17·4
Plot B	17·8	17·5	18·1	17·9	18·4	18·0	16·1	18·9	17·7

By comparing the results the following differences may be noticed:— Throughout the whole three months the upper 2ft. below the mulched surface contained more water than below the compact surface. For May, plot A contains in the upper 2ft. 87galls. more water per square rod than plot B; that is, an equivalent for a rainfall of six-tenths of an inch, or three-tenths of the total rainfall for the month. In June, a difference again is observed in favor of plot A of 57galls. per square rod, or equivalent for four-tenths of an inch of rainfall, or about one-eighth of the total rainfall for the month. For July there is a difference of 68galls. per square rod, which is three-fourths of the total rainfall, or about half an inch. These results are presented in the following table:—

	May	June.	July.
Per cent. of total rainfall.....	2·02in.	3·36in.	1·33in.
Per cent saved by surface cultivation.....	$\frac{1}{5}$, or 30 %	$\frac{1}{4}$, or 12½ %	$\frac{3}{8}$, or 37½ %

This shows that the drier the weather the greater the beneficial effect of surface cultivation. During wet weather surface cultivation has less effect on the saving of moisture. During dry weather surface cultivation will make all the difference between failure and a good crop. It will be noted that, whilst the 2ft. nearest the surface have more water when mulched (or broken up), the third foot foot invariably has less. This shows that the extra amount of water in the 2ft. at top is due not only to the loosening of the surface, preventing evaporation, but also to the preservation of the capillary power of the same soil through being moist, and this draws the moisture from below. The conclusions are (1) that surface cultivation conserves moisture (and the drier the weather the greater is the relative effect), and (2) that surface cultivation keeps the ground in better condition for lifting the water from below the roots of plants.

AN INCH OF RAIN, AND WHAT IT MEANS.

At the Democratic Club, on May 7, Mr. J. G. O. Tepper, F.L.S., gave an interesting and instructive lecture on this subject. He said that rain in sub-tropical countries like South Australia is of much more importance than where winter snows prevail. The quantity received is gauged and estimated by inches, and tenths, and hundredths, or even thousandths parts of them. Yet there are perhaps few people who have taken the trouble to get a correct idea of what 1 in. of rain means when translated into common speech and fluid measure, that is, gallons. A gallon contains 277 cub. in. and a fraction. A flat vessel holding 1 gall., and 1 in. deep, would therefore cover 277 sq. in. As 1 sq. ft. contains 144 sq. in., 1 gall. of water would cover nearly 2 sq. ft., and as 1 sq. yd. contains 9 sq. ft., it will require $4\frac{1}{2}$ galls., roughly, to cover 1 sq. yd. of ground 1 in. deep, *i.e.*, 1 in. of rain means $4\frac{1}{2}$ galls. per square yard. At this rate it requires, roughly, 2,250 galls. per square chain, or 22,500 galls. per acre, or 14,500,000 galls. per square mile. This will give an idea to ordinary people how to calculate quantities required for irrigating extensive areas effectively. As the average rainfall varies from 5 in. to 31 in. per year in South Australia, the above quantities have to be multiplied for each district by the above numbers of inches. There is, however, an immense difference between the recorded rainfall and its beneficial effect, for only that portion is effective which is retained in the ground from one rainy season to the next. Hence all, or nearly all, of that part which flows away in gutters and watercourses, or which drains rapidly to great depths, has to be deducted, the remainder alone being available for purposes of vegetation and cultivation. The more grass, shrubs, and trees cover the ground the slower can the rain water flow away, and the more will soak in. From bare ground (unless loose, sandy, or gravelly) by far the most will flow off. Further, if the bare ground be already moist, and this moisture extends to a considerable depth, each slight rainfall will add to the stock. This is the case in woodlands or land covered with tall and dense grasses. But if the bare ground contains much clay, and is dry, by far the greater amount of rain will flow away uselessly in runnels and creeks, or form stagnant pools to be dried up by the winds. The reason is that dry, and still more so hot, ground can but slowly take up moisture, on account of the air enclosed, which presses upwards, being prevented from escape by the surface water sealing up its pores hermetically. This shows how important it is to conserve moisture in the soil by keeping it covered with vegetation of some sort, so long as it be green. How deeply does 1 in. of rain affect dry ground? If we fill a tube, say, a lamp cylinder, with clayey soil (common earth), and let it get dry, after dumping it about as tight as the ground is which we wish to examine, and leaving a depth of 1 in. at the top, we get a good and practical idea of the effect of putting 1 in. of water on top. It will then be found that it takes a considerable time before any moisture gets to the bottom, and that that 1 in. of water will barely suffice to moisten (not saturate) the earth to a depth of from 9 in. to 12 in. Now, on a hot summer day, with a fair breeze, about $\frac{1}{2}$ in. of water will evaporate from any water surface, *i.e.*, about 1 gall. per square yard, and the equivalent of 3 in. of ground moisture; that is, the ground dries to such a depth in a day on the surface. If the ground be moist, continuously moist down to the permanent water supply, this rate of surface drying will not hold good, for the loss by evaporation is made up partly by capillary rising of the water or even balanced. But if the ground be dry and hot for many feet, and a dry belt be left between the moist part at the surface and the bottom moisture, then it will not only dry from the surface downwards but from the lower side of the moist surface upwards. In that case—and it is

the ordinary one over most parts of this country in the warmer part of the year—an inch of rain may only last for a week or ten days at the best. There is, therefore, no reason for jubilation over a few points, as is sometimes indulged in by newspaper correspondents and others. The cooling and wetting may result in allowing the subterranean moisture to ascend within reach of the roots, where there are any, but in by far the greater number of soils or regions of South Australia this is not the case. The slight falls which make up so much of the “averages” are simply of illusionary benefit, in most cases tending to keep up people’s false hopes and habits of thought and action. Where there are more or less extensive woodlands (sandy scrubs and forests), morasses, lakes, &c., at a higher or not much lower level than the surrounding country, and in soil to some extent porous, the natural law of diffusion of liquids comes into play, which causes the greater moisture of one place to extend quickly or slowly to the farthest limits of such continuity of subsoil moisture. Thus the level plains at the foot of wooded hills or surrounding raised sandy areas, ponds, &c., obtain a constant, invisible, though may be slow, supply over and above that which they themselves gathered. Hence the exceedingly great importance of keeping all these protected to the fullest extent of man’s power, besides all the other benefits they may confer. If we do not, even irrigation will not only not save us, but make matters worse in many cases. In calculating the amount of benefit from an inch of rain, or any quantity, we must distribute the water that soaks in where it can over those parts where it cannot, for it is not only diffused downwards but laterally (sideways) as well. If we do not, our calculations will prove all wrong in two ways. First, we will find that our ground dries much faster than we thought; and secondly, if diffusion is prevented, and especially if other than rain water be used, the ground will gradually become so saturated with salts that finally nothing will grow. The only way to get rid of this difficulty is to allow and provide for efficient drainage both or at least, either way. Now what is rain? Where does it come from? What promotes or prevents it? These are questions easily put, but not so easily answered. Shortly we may say rain is the water falling from the clouds in larger or smaller drops. But then the questions arise, how does it get there in such enormous quantities? What are clouds? How do they form? Whence come they, and whither do they go? These questions were dealt with at some length, and it was shown that the rain came as vapor from the Indian Ocean invisibly; that clouds (formed of dust particles as bubbles and upheld by electric action) were the vapor condensed by getting cooler, and that therefore the frequency or paucity of rain depended on the condensing (*i.e.*, cooling) capacity of the land, &c., over which they passed. The only agent in nature to make land a condensing area is perennial green foliage, which absorbs heat and prevents radiation of heat most effectively in summer, when the fiercest light prevailed. Our droughts are the consequence of too much clearing, yet our State forests and woodland areas (= half acre per square mile) were every year decreased, and this paid for by the State as improvements.

BONE SUPERPHOSPHATE.—After boiling the bones to remove the fat, which prevents decomposition for a long time, return the bones to a wooden or leaden cistern, and sprinkle thoroughly and slowly with 50galls. water to moisten 1 ton bones; then sprinkle with 850lbs. (50galls.) brown sulphuric acid, diluted with 50galls. water. [One ton bones, 50galls. water to moisten them; 850lbs. brown sulphuric acid mixed with 50galls. water, to sprinkle on the moistened bones.] To sprinkle the diluted acid use a leaden watering pot, with leaden rose. The “soup” from the boiled bones should be mixed with the super., but the fat should be first skimmed off, and may be used for soap-making after being refined. After two days mix dry loam with the super. to dry it.

DAIRY NOTES.

The 1898 annual report of the Ontario Agricultural College and Experimental Farm contains an interesting record of their dairy herd, which consists of four Jersey cows, three Holsteins, one Ayrshire, and twenty-five grade cows and heifers. The average number of cows milked is twenty per day. An approximate account of the food given to each cow is kept; also the daily milk yields and the quality of same. The hay was valued at £1 5s. per ton, silage 5s. 6d., mangolds 3½d. per bushel, oats 3s. per 100lbs., ground peas 3s. 2d. per 100lbs., bran 2s. 1d. per 100lbs.; pasture was charged for at 4s. 2d. per cow per month for five months.

The cost of food per cow ranged from £4 to £9 per annum; the yield of milk from 3,000lbs to 10,000lbs.; of butter, 186lbs. to 437lbs.; and cheese, 400lbs. to nearly 1,000lbs. per annum. The cow that consumed the most feed produced the greatest amount of milk. The cows at the top and bottom of the record were of the same breed, showing very plainly that selection of individuals as well as of breeds is necessary. The cost of food to produce a gallon of milk varied from a little over 1½d. to 3½d., of a pound of butter from a little over 3d. to 7½d., and of a pound of cheese from 1½d. to 3½d.

A Jersey and a grade cow were level for lowest cost of producing a gallon of milk; the third, fourth, and fifth being also grade cows, the sixth being a Holstein. In butter a Jersey was again at the head for lowest cost, two grades next, then an Ayrshire and five more grade cows. The cow producing butter at the highest cost was a Holstein. In cheese a Jersey cow again headed the list as producing a pound of cheese at the lowest cost; in fact, this cow came out best in each list, giving 7,611lbs. milk at cost of 1·87d. per gallon, containing fat to produce 437lbs. of butter costing 3½d., or 963lbs. cheese at cost of 1½d. per pound. Two grade cows came second and third in cheese production, then an Ayrshire, a Holstein again occupying the bottom of the list. In each case only two Jerseys are included in the figures. The grade cows averaged better than the others, but no particulars are given as to breeding of same.

Experiments were tried with numerous mixtures to protect the cows from flies. The following was found the best:—Ten pounds lard, 1pt coal oil, 1pt. coal tar, and 2ozs. crude carbolic acid. Melt the lard, pour in tar and mix thoroughly, remove from fire and add the oil and carbolic acid, applying at once to all parts of the body. This kept off the flies for from three to seven days.

BUTTER-TESTING.

BY G. S. THOMSON, N.D.D.

Continuing from article on "Butter-testing," in February issue of *Journal*, the following pages will conclude the examination. A short report has already been sent to each of the factories which took part in the test; but it principally dealt with the analytical portion of the work, suggestions only being offered whenever a favorable opportunity was afforded. The butter was manufactured upon the usual lines, no special alteration in principle of work being advocated, and a list of questions was submitted to each maker. These questions were satisfactorily answered, although a few overlooked a number of points.

Question 1.—Date of manufacture of butter and conditions of weather from milking to completion of butter-making.

Answer.—Average time October 14, and weather conditions temperate.

Question 2.—Nature of feeding; whether entirely on natural herbage, or if roots or ensilage were given.

Answer.—In all cases natural herbage.

Question 3.—Is the milk aerated or cooled in any way before being sent to the factory?

Answer.—In only one case has an attempt been made to carry out this very important factor. It is within the sphere of a number of farmers to cool down their milk immediately after milking, and thus reduce the prevalence of sour milk being offered to the factory manager. Covering the milk cans with wet bags during transit from farm to factory assists in maintaining a low temperature, but this is unfortunately seldom done.

Question 4.—How often are the cows generally milked?

Answer.—In every case twice a day.

Question 5.—Construction of milk cans and how ventilated.

Answer.—All Simpson's pattern.

Question 6.—Average distance milk is sent to the factory.

Answer.—The average distance was calculated to be three miles, but a singular thing is that the best butter was manufactured at those factories furthest away from their milk supply.

Question 7.—Quantity of milk and quantity of separated cream required to make 56lbs. of butter.

Name of Factory.	Gallons of Milk.	Gallons of Cream.	Gallons of Milk to the Lb. of Butter.	Lbs of Butter to the Gal. of Cream.	Lbs. of Cream to Lb. of Butter.
(1) Clarendon	119	11.5	2.08	4.95	2.02
(2) Clare	126	—	2.21	—	—
(3) Onkaparinga	127	13.5	2.22	4.22	2.36
(4) Robertstown	130	13.5	2.28	4.22	2.36
(5) Mount Pleasant	136	—	2.38	—	—
(6) Mount Gambier	140	14.5	2.45	3.93	2.54
(7) Gumeracha	140	13	2.45	4.38	2.28
(8) Point Sturt (Yelland's)	140	12.25	2.45	4.65	2.15
Averages	132.22	13.41	2.31	4.39	2.31

From the above table the value of the districts in the production of butter fat is very marked. Comparing Clarendon with the three last districts, 21galls. less milk is required to make 57lbs. of butter. To explain this difference we must not neglect to recognise the influence of breed, and around Clarendon the value of stock for butter-production is second to none in the colony. The averages given in the table are very satisfactory, and point to a uniformity in separation and care in manipulation of the cream in butter-making.

Question 8.—Temperature of milk and time when separated.

Answer.—(1) 92° F., (2) 85° F., (3) not stated, (4) 76° F., (5) 95° F., (6) 88° F., (7) 85° F., (8) 62° F. Time was not stated in most cases. I would advise that attention be paid to article on separation in *Journal* of June, 1898.

Question 9.—How is the cream cooled, and for how long?

Answer.—A number did not attempt this question, probably not having a satisfactory answer. In the hot weather cream-cooling is one of the greatest obstacles the buttermaker has to contend with, and excessive losses are inevitable when no means of refrigeration are resorted to. It is possible to reduce the temperature of cream by lowering the cans into deep wells where the degree of heat does not exceed 60° F. In other cases, where a plentiful supply of water is within reach and obtainable at little cost, perforated iron or lead pipes may be placed at right angles immediately under

the ceiling of the butter-making room, and a current of water made to descend over a sheeting of canvas. An escape for the water must be provided at the greatest fall on the floor. It is desirable that thorough ventilation be made, and a current of air kept in circulation in order to facilitate in the falling temperature. Double roofing of the factory, when resorted to, is always accompanied with a proportion of success, similarly is insulation of the walls a valuable aid in the reduction of heat. Whitewashing, canvassing, and painting are all attended with gain and profit. It is worthy of note that where a factory is situated on an elevated piece of ground with a sharp slope facing a cool direction, a drain could be advantageously constructed and directed into the floor of the butter-making room and a draught of air maintained. Where large supplies of butter have to be manufactured, refrigerating machinery is indispensable, and an illustration of its value will be observable further on in the paper. Only one instance is recorded where a Lawrence cooler was used in a factory taking part in this test.

Question 10.—Time of ripening of cream and temperature if starter is used.

Answer.—By rotation of factories in the foregoing table the following figures indicate the periods of ripening:—Hours, 20, 60, 34, 30, 12, 48, 24, 48.

By the above hours, and glancing at their numbers, it appears that in a number of cases ripeness had not been permitted to attain the desirable degree, the practical examination of the butter affording reason for this belief.

I would strongly urge everyone to obtain the alkaline test, and after a little practice the proper degree of acidity could be arrived at by means of taste alone. The apparatus and chemicals can be bought at a nominal price, and, as I have already a few orders from private parties, those desirous of purchasing the instrument and accessories can forward to me their names and addresses, and upon receipt of which the test, along with directions for use, will be sent.

No starter was used by any of the factories.

Experiments will shortly be carried on with various ferments now in the market, and their value as an aid to the quality of butter published.

Question 11. (a) Is the cream strained when put into the churn? (b) How long churned?

Answer. (a) In no case was this done. Straining is necessary with thin cream, as the large quantity of skim milk descends to the bottom of the ripening cans and becomes coagulated in large solid clots, and also in small portions mingled with the cream. When this is turned into the churn white specks are to be found mixed with the grains of butter after churning, and to separate them is attended with great difficulty, or is, rather, a matter of impossibility.

(b) Minutes, 39, 22, 38, 30, 35, 25, 35, 25. Numbers 2, 4, and 8 were the superior samples of butter, and it will be observed that their periods of cream-ripening range from thirty to sixty hours. Long churning means loss of butter fat, and more so when speed is increased towards the breaking stage. Loss of fat is also sustained by rapid churning. Revolutions of churn ought to be regulated according to ripeness, thickness, temperature, and quantity of cream to be treated.

Question 12. Give temperature of cream in churn; give temperature of churn room; give temperature of air outside in shade.

Answer—

No. 1.....	56	60	49	No. 5.....	60	64	72
No. 2.....	62	50	60	No. 6.....	58	60	76
No. 3.....	58	60	72	No. 7.....	59	59	64
No. 4.....	63	64	62	No. 8.....	58	66	68

It will be seen that the temperature of the cream is higher in Nos. 1, 2, and 4 than the temperature of the air outside, but this may readily be accounted for by a rapid fall of the thermometer outside, and following a spasm of heat.

By a careful consideration of the above figures, and possessing a knowledge of the various factories, I am convinced of the prevalence of insufficient and inefficient ventilation, and, by information given in the answers to questions, the entire want of a cheap means of refrigeration. Nos. 3 and 6 have had the highest outside thermometer readings to combat against, but the value of the refrigerator is clearly demonstrated in both the cream and butter room temperatures being normal and also similar.

Question 13. Give time from commencement of churning till buttermilk is run off; average size of butter grains at this stage.

Answer—

Time.	Size of Butter Grains.	Time.	Size of Butter Grains.
45min.	Size of wheat	30min.	Size of grains of wheat
25min.	Size of grains of rice	30min.	Size of grains of wheat
45min.	Size of wheat	37min.	Size of pinheads
31min.	—	37min.	—

At the close of churning butter is generally soft, and it may be seen from the accompanying that the buttermilk has been allowed to lie too long in the butter. Immediate running off is necessary, and permitting the butter grains to remain in the washing water for a time, or better still, in the brine, will remove excess of buttermilk, and harden the texture of the grains.

Question 14.—How often is butter washed; is spring or rain water used?

Answer.—Nos. 5, 6, 7, and 8 have found it necessary to wash a number of times and upon examination I expected to find a decided weakness in aroma; but this was not the case. With all the washing, however, there remained a quantity of buttermilk. Had brining been done the quality of the butter would have been superior.

Questions 15 and 16.—Mode of salting. Quantity used and brand.

Question 17.—How long and how often is butter worked?

Question 18.—Quantity of color, when added, and brand.

Answers—

No.	Cream Ripening	Period of Churning.	Running off the Buttermilk.	Time in Washing	Spring or Rain Water.	Salting.			Coloring.	
						Whe e.	Quantity	Brand	Quantity.	Brand.
	hrs.	min.	min.				lbs. ozs.			
1 ..	20	39	45	2	spring	worker	2 0	Higgins	4oz.	W, R.
2 ..	60	22	25	2	spring	"	1 7	Castle	none	
3 ..	34	38	45	2	rain	"	2 0	Higgins	1 $\frac{3}{4}$ oz.	W, R.
4 ..	30	30	31	2	spring	"	1 11	Arab	none	
5 ..	12	35	30	4	spring	"	2 0	—	14dr.	W, R.
6 ..	48	25	30	4	spring	"	1 7	Hickson	none	
7 ..	24	35	37	3	spring	"	1 11	Higgins	1oz.	Hansen
8 ..	48	25	37	3	rain	churn and worker	1 11	Hickson	2 $\frac{1}{2}$ dr.	

Nos. 4 and 8, along with the box of pasteurised pounded butter, were selected for shipment to England. Unfortunately information as to the manufacture of the pasteurised butter was not received, but I am informed that the pasteurising temperature of the cream was 154° F., and that the butter was brined in the churn with the best English salt, but no coloring was added. The analysis of this "sample" proved the presence of an excess of buttermilk, owing to the day of making being excessively hot, and a sufficient quantity of chilled water not being forthcoming. No. 4 used no coloring, and No. 8 butter was salted in both the churn and worker. Time of salting on worker ranged from five to

eight minutes with some makers, but one extended the period to twenty minutes. Readers would do well to look up the August number of the *Journal*, and read over the portion devoted to butter working.

Final Examination of Nos. 4 and 8 and Pasteurised Butter.—Upon return of butter from London, after a lapse of fully six months from date of manufacture, which included over twelve weeks in the Government dépôt, I made a careful examination of the three samples, and can pronounce the pasteurised butter slightly superior. The cream from which this butter was manufactured was ripened by means of a starter or culture.

No. 4 sample deserves a creditable mention; it has a faint tallowy taste, but is quite agreeable and can be classed with the flavor of the average butter in the market at the present day. Streakiness is almost absent. No annatto was added by the manufacturer, the natural color imparting a desirable appearance, in fact, the butter seemed quite high enough in color for the English market; although not rich enough to meet the requirements of our consumers, who too frequently judge the quality of butter from the prevalence of the deceptive and injurious annatto.

No. 8 was not quite so free from tallowiness as No. 4, still it was also a creditable sample. Preservitas and coloring matter were both added to this butter. Streakiness was much more extensive than in No. 4. Texture of Nos. 4 and 8 were inferior to the pasteurised butter, which is contrary to general experience.

Color.—Samples of the three butters were exposed to the influence of daylight, and at the expiry of four days No. 8 exhibited a bleaching of color, and at the end of fourteen days color appeared to be entirely gone, leaving a very tallowy tasting butter behind.

On closer examination portions escaping the influence of light were slightly affected, but the color also disappeared after a period of short exposure. No. 4 remained unaffected, pasteurised butter gave a slight bleaching on the surface.

It is pleasant to know that the importance of reducing the coloring of butter has been discussed by the Dairy Board, and the sooner this fault receives the serious consideration of our buttermakers the better for all concerned. Some authorities look upon the coloring of butter and cheese above a certain standard as adulteration, and justly so, as annatto is put in to deceive the consumer, not to raise the quality of the product. We color our dairy produce higher than any recognised dairy country in Europe, and it seems a pity to think that we should be the last to put into operation this much behaved change in our manufacture.

SEPARATOR SLIME.

By G. S. THOMSON, N.D.D.

Upon further request quantities of separator slime have been sent from several factories for microscopic examination. These have been carefully examined at the Adelaide Hospital bacteriological laboratory, with a result which necessitates me to ask every factory or creamery manager to warn all their suppliers that a thorough examination of their cows' udders is necessary. Insist upon all suspicious cows being isolated until an examination is made by some competent authority. Upon no account must the milk be used or sent to the factory where a cow is suffering from udder complaint. Information given in a previous issue of this journal concerning the dangers of separator slime has been verified.

In connection with this matter I would call special attention of all dairymen to the fact that the new Health Act provides that no person who shall supply to anyone the milk or milk products of any diseased animal or any animal suffering from ulcers or other diseases of the udder under a penalty of £20, and that it shall be no defence that the owner did not know the animal was diseased. It is also prohibited to use milk from diseased cows for feeding to pigs or other animals.

EXPORT OF PERISHABLE PRODUCTS FROM VICTORIA.

The annual report of Mr. David Wilson, the head of the department dealing with the export of perishable products in Victoria, gives some idea of the magnitude of the business developed during late years. The report covers the business transacted during the year ending April 30th, 1899, and the following table gives the value and quantity of the various lines dealt in:—

Produce and Quantity	Value.
Butter, 8,800 tons	£888,000
Condensed milk and cream, 3,136 crates	3,136
Rabbits, 1,210,139 pairs	90,760
Hares, 1,040 pairs ..	208
Poultry, &c., 400 crates	800
Eggs, 11,540 dozen	577
Mutton and lamb, 43,597 carcasses	21,798
Veal, 410 sides	1,200
Beef, 38 quarters	76
Fruit, 8,451 cases	5,070
Tobacco, 65,948 lbs.	1,100
Total	£1,012,725

Of the 8,880 tons of butter exported during this season, 7,103 tons, valued at £718,300, were consigned to London; 1,000 tons, valued at £100,000, were consigned to West Australia; and 697 tons, valued at £69,700, were consigned to Cape Colony.

Although the export of butter is 1,713 tons above the previous year, it is still a long way behind the record of 1894-5, when 11,584 tons, valued at £1,081,000, were exported. Mr. Wilson estimates that the direct loss on the export of butter alone, caused by the drought of the past three years, amounts to nearly one million pounds sterling.

It will be seen that the export of rabbits has reached very large dimensions, and, unless it leads to practically farming rabbits, it must be of great assistance to stockowners in reducing the numbers of the pest. There certainly seems a danger that the amount of money invested in factories, &c., and the number of men employed in trapping and handling is likely to lead to the encouragement of rabbits by landowners near to factories when the pest becomes thinned out by the operations of the trappers. Commencing in 1894-5, 89,000 pairs rabbits were exported; while last season the total was nearly 1,250,000 pairs. This does not represent the whole of the destruction caused by the export trade, as a very large proportion of the rabbits trapped are unfit for export, and are utilised for other purposes.

The export of poultry has not advanced to the extent expected, owing partly to mismanagement by the London agents. Mr. Wilson sees no reason why, with abundance of cheap wheat and milk, their farmers should not make the breeding and fattening of poultry one of the most profitable branches of their business.

HOUSEHOLD HINTS.

FOR SEALING BOTTLES.—Three parts resin, one part caustic soda, five parts water. Mix this with half its weight of plaster of Paris. Use it all within half an hour, as it sets hard in forty-five minutes.

CEMENT FOR CHINA.—Burn oyster shells to powder, sift the powder through fine muslin, then mix some of the sifted powder with enough white of egg to form a paste. Apply to the edges broken, fix them together, and when dry neither fire nor water will dissolve the union.

SKIM MILK PAINT.—By adding Portland cement to skim milk until a cream-like consistency ensues a light yellowish paint will be produced. This is very durable, and its color may be altered by adding ochre, gamboge, bone-black, or other painters' pigments. Another good pure white paint can be made with 6lbs. of whiting and 2lbs. new lime, mixed with sufficient skim milk to make a thin paint, then add a pint of boiled linseed oil, and let stand twenty-four hours before using.

POULTRY NOTES.

By D. F. LAURIE.

I have long been of opinion that there is an opening for the proprietors of butter factories and creameries in the direction of rearing, or at least fattening, poultry for both the local market and for export. The value of the poultry industry is being more fully recognised, and from the numerous inquiries I receive, and which I am very pleased to answer, I feel sure that at no distant date a considerable advance will be made. Still the chief obstacle, as regards the export trade, is the absence of fattening establishments. From the poultry breeders' point of view there are perhaps objections to private establishments; but the case can be well met by some form of co-operation. Uniformity in quality and grade are the most important points in the export trade. It is of no use pointing to our well-equipped Produce Export Depot if means cannot be devised for fairly large shipments of high-grade poultry. High-class Australian poultry has always found a remunerative market in England if offered at the proper season. Only recently prime Sydney ducklings realised 8s. per couple in London. The reports from Messrs. C. E. Brooke & Sons, the leading firm in Leadenhall Street, and of another leading firm of importers, are very pleasing. The appearance, get up, and culinary properties of the birds have elicited high praise from those experts. The Australian exporters are further urged to make large shipments of equal quality, so as to reduce shipping and other charges. To this point particular attention is directed, and it is here especially that a profitable opening appears for factory owners and others who have the necessary facilities. The cost of food would be much less than in ordinary cases, and the business arrangements are such that the packing and forwarding of large consignments of properly fattened, carefully graded poultry are quite feasible; whereas the individual breeder's operations are not of sufficient magnitude to enable him to have ready at one time a sufficient number of high-class birds.

There must be a vast improvement in the general run of poultry if money is to be made. Particular attention should be directed to the breeding and fattening of ducklings, for which, if of fine quality, an enormous market in England is always to be found during March, April, May, and the first half of June. It would be necessary to obtain first-class, large, good-bodied Pekin ducks, and mate with Aylesbury drakes of equal quality. On the co-operative system either of two methods might be adopted, as follows:—Let the central body

keep the stock ducks and deliver eggs for hatching to members or surrounding farmers or others. At about six weeks of age all ducklings in a suitable condition should be brought in for fattening. Numerous small, cheaply-constructed enclosures would be necessary, so that the young birds could be graded and attended to. Sound skim milk, with the addition of various meals such as wheatmeal, barleymeal, bran and pollard mixed with a little fat, would turn out a fat duckling fit for export at from eight to nine weeks old at a cost of from 9d. to 1s. Export charges would be about 1s. 3d. each; average price in London, 3s. 6d.; this would leave a minimum profit of 1s. 3d., or 2s. 6d. per pair. In time, with a fair amount of co-operation, the business could be extended, the cost of production reduced, and consequently the average profit would be much greater. Our geographical position gives us the great advantage of being able to land our poultry and eggs in London at a period of scarcity and consequent high prices. The *Leader* publishes the following as regards the value of skim milk as an adjunct to poultry foods:—

Skim milk, which has been publicly disparaged of late, is rehabilitated of late in the *English Board of Agriculture's Journal*, in which it is observed that milk loses little in actual food value by skimming. Although most of the fat is removed in the cream, the most valuable food constituents, viz., nitrogenous substances are left behind in the skim milk, which contains much nutritive material in a form which is, as a rule, easily digested. Its value as a feeding substance for chickens has been proved by the United States Department of Agriculture, in some experiments at the Indian Station. Here is the description of the experiment:—Two uniform lots of ten chickens each, five Plymouth Rocks and five Houdans, four to six weeks old, were fed from July 1st to September 5th under identical conditions, except that one lot received, in addition to the food given to the other, all the skim milk they would take. It was found that the lot receiving skim milk ate more of the mixed food, and made a more rapid and satisfactory gain than the lot which did not receive skim milk. Milk fed chickens made an average weekly gain in weight of about 4½ ozs., while those receiving no milk put on about 2½ ozs. The most rapid increase in weight occurred at those periods when the largest amounts of skim milk were consumed.

The New South Wales Board of Exports are thoroughly alive to the importance of the poultry export trade, they have made very considerable shipments also to South Africa.

The export of eggs can never be put on a satisfactory footing without combined effort. The principal feature of such a trade must consist in the ability of the shipper to obtain sufficient quantities of fresh infertile (or sterile) eggs. The risk of sending fertile eggs to such a distant market is very great.

I have before me a splendid publication of over 400 pages, "The Australasian Book of Poultry," by Mr. A. J. Compton, of Sydney. This book is quite up to date, and its chief merit lies in the fact that the subject is dealt with from an Australian point of view. I need hardly state that Mr. Compton is in every way well fitted and entitled to deal with so important a matter. In addition he has availed himself of the friendly assistance of many well-known specialists throughout Australia. This valuable work is published by Messrs. George Robertson & Co., is well bound and printed, and abounds in excellent illustrations, as a rule from life. The chapter dealing with diseases is of special value to those residing at a distance. The symptoms are very lucidly explained, and should enable anyone to find a good remedy.

I have at different times written a good deal about diseases and their treatment, for publication in this journal. Prevention is, however, better than cure. House and feed your birds well, provide good sound wholesome food, ample greenstuff, fresh clean water, allow no accumulations of filth, and attend carefully to ventilation. Grade the young stock and keep them growing. Each year the aim should be to improve the quality of the stock and increase their productiveness. The value of an early start cannot be pointed out too clearly. My address is at "The Engineer-in-Chief's Office, Victoria Square, Adelaide."

PRESERVING EGGS IN WATERGLASS.

During 1898 experiments with waterglass for preserving eggs were carried out at the Ontario Agricultural College, with a view to determining the best strength to use. On May 27th, 12doz. fresh eggs were put in pickle, three strengths being used, viz., one part waterglass in semi-fluid form to ten parts water, to fifteen parts water, and to twenty parts water respectively. The first was found to be too strong, and the eggs floated. The second and third were all right in this respect, but the weakest solution gave perfect satisfaction. The eggs were tested from time to time, and on breaking some the yolk stood up exactly as in new laid eggs, and showed no tendency to decay. Half a dozen eggs were tested from each solution on the 1st of December, more than six months after being placed in the pickle, and in every case they were all quite good, there being no difference in appearance between those preserved in the different strength solutions; consequently the weakest strength, being cheapest, is the best to use. The pickle is made as follows:—Boil 20pts. water, and when cool pour in 1pt. of waterglass, stirring well. Place the eggs in the receptacle in which they are to be kept, and pour the solution over them, covering them completely. Waterglass can be obtained in Adelaide at 6d. per lb. in large quantities, so that the pickle should be both cheap and easy to prepare. It is of course essential that nothing but absolutely fresh eggs are pickled, and that before boiling them the shells should be punctured with a needle to prevent bursting.

USE OF COMMERCIAL FERTILISERS IN SOUTH AUSTRALIA.

BY W. L. SUMMERS, INSPECTOR OF FERTILISERS.

In view of the rapid expansion of the practice of drilling in fertilisers with cereals, a few facts concerning the use of commercial fertilisers in South Australia for grain and hay crops will doubtless be of interest. It is only since 1896 season that the use of fertilisers in this colony for cereal crops has become anything like a general practice. In the earlier days of the colony there were a number of farmers who had strong faith in the value of bonedust for wheat-crops, and some of these continued using it for many years. Amongst these may be mentioned Mr. J. Brock, of New Mecklenburg, Barossa district, and Mr. Chas. Rake, of Enfield. The latter still uses bonedust made by himself. In 1881 Professor Custance, of the newly-established Agricultural College at Roseworthy, reported very favorably of the use of bonedust and guano, and later on advocated the use of superphosphate as the best and cheapest manure for the wheat plant, but stated that the quantity used per acre, if properly distributed in the soil, should *not exceed* 3cwts. Soon after his arrival in the colony Professor Lowrie came to the same conclusion as his predecessor, *i.e.*, that phosphatic fertilisers were specially suitable for wheat-growing under South Australian conditions, and ever since he has strongly advocated their use, having given very many addresses on the subject, principally under the auspices of the country Branches of the Agricultural Bureau. The professor advocates the use of 1½cwts. to 2cwts. per acre for grain. The first locality in which drilling the seed and manure in together became general was Yorke's Peninsula, where, owing very largely to the favorable results obtained by Messrs. Cudmore and Parsons in 1892-3, and by Messrs. Correll Bros. and others later, from the application of 1cwt. or less of phosphatic manures, a large amount of interest was aroused in the practice. In 1895 the practice was adopted by a large

number of farmers, and from that year the increase has been most marked. The amount per acre applied by farmers averages from 84lbs. to 112lbs

The following figures concerning the importation of fertilisers will show how rapidly the practice has extended :—

Year.	Bones and Bonedust. Tons.	Manure. Tons.	Total Value. £
1895.....	16	*—	670
1896.....	75	*—	2,790
1897.....	81	4,657	16,958
1898.....	244	12,532	38,019
1899 (to end of May)	—	9,241	28,277

* Tonnage not available.

The column "Value" is the value at port of shipment, plus 10 per cent. In the case of manures this does not cover the expenses of freight, wharfage, insurance, &c., which on an average will amount to nearly, if not more than, 33 per cent. of cost at port of shipment. Adding to this cost of handling here merchants' profits and local carriage, will bring the actual cost to the farmer fully 50 per cent. above the value shown in the table.

The local production has also increased to a very large extent, and the local factories, &c., are taxed to their utmost to keep pace with the demand this season. From information supplied by nearly all the principal manufacturers, I estimate that the total local production of commercial fertilisers for the six months ending May 31st, 1899, will amount to 7,500 tons of which about 4,000 tons will be made up of native guano. During the same period the importations amounted to nearly 13,500 tons.

Of the total importation about 4,500 tons consisted of Thomas phosphate, the balance, about 9,000 tons, being principally mineral super.

The period from December 1st to May 31st is taken because practically all the imported manures used for wheat arrive here between the dates mentioned, and probably 95 per cent. of the local production during that period is also used for wheat. In 1897 it was estimated that about 3,000 tons of fertilisers were used on 60,000 acres, in 1898 about 14,000 tons on about 250,000 acres, and this year I believe I am within the mark in putting the total at nearly 20,000 tons on 400,000 acres of land. The tonnage is made up of 13,500 tons of imported manure and 7,500 tons local, allowing 1,000 tons to have been used for other than cereal crops, and putting the average at 20 acres to the ton of manure, which is, I believe, under the average.

Looking at the financial aspect of the matter, the value of manure imported during the six months mentioned as declared for Customs purposes will amount to nearly £42,000; add 50 per cent. to this for expenses mentioned before, and we can put the cost of the imported manure at £63,000. The cost of the locally produced fertilisers would amount to quite £30,000, or a total expenditure of nearly £100,000. This represents an expenditure of about 5s. per acre for manure, which will be found to be about the average, as with guano and Thomas phosphate the amount per acre usually applied will not exceed 4s. in value, while the great majority of those who use the higher priced manures do not put on more than 5s. worth per acre. At the present price of wheat it will require an increased yield of 2bush. per acre to pay for the cost of the manure used, and at least another 2bush. extra should be averaged by those using drills and fertilisers. Where the land has been properly prepared the increase from the use of commercial fertilisers will probably be nearer 8bush. than 4bush. per acre. Taking, however, 4bush. as an average, it will mean an addition to the harvest next year of, say, 1,600,000bush. of wheat, which at present value would be worth £200,000. If this estimate is correct, we can safely say that nearly one-fifth of the area cropped with wheat will this year be manured with commercial fertilisers.

ANALYSES OF COMMERCIAL FERTILISERS.

BY W. L. SUMMERS, INSPECTOR OF FERTILISERS.

The following additional analyses of samples of fertilisers obtained by myself are published for general information:—

Kangaroo brand guano from Messrs. A. W. Sandford & Co.—52·1 per cent. tricalcic phosphate. Althorpe Island guano from Messrs. A. W. Sandford & Co.—24 per cent. tricalcic phosphate; 0·92 per cent. ammonia.

Cave guano from Lake Fowler Fertiliser Co., Edithburgh.—23·58 per cent. tricalcic phosphate; 0·51 per cent. ammonia.

Acme fertiliser from Lake Fowler Fertiliser Co., Edithburgh.—0·5 per cent. soluble phosphoric acid; 6 per cent. insoluble phosphoric acid; 1·3 per cent. ammonia.

Victor bonedust from Messrs. E. Anders & Sons, Freeling.—40 per cent. tricalcic phosphate; 4·76 per cent. ammonia.

In last month's issue, owing to an error on the part of the printer, Bally bonemeal was in one place stated to contain 49·3 per cent. ammonia instead of 4·93 per cent., the decimal point being shifted. The error was obvious, the correct figures being given again immediately afterwards.

The Acme fertiliser is a new mixture, put on the market this season by a company formed for the purpose, the works being situate at Edithburgh, Yorke's Peninsula. About 45 per cent. of it consists of cave guano (the analysis of which is given above) and 40 per cent. is crude gypsum. Nitric acid, nitrate of soda, dissolved bone, and bonedust are also used in the manufacture of the fertiliser. The price charged for it is £3 15s. per ton, and it has met with ready sale, principally amongst the farmers of Southern Yorke's Peninsula. It is interesting to compare the analysis of this fertiliser with the analysis of super. guano as manufactured by the Adelaide Chemical Works and sold at the same price:—

	Phosphoric Acid Total.	Phosphoric Acid Soluble in Water.	Nitrogen = to Ammonia.
Acme fertiliser	6·5 per cent.	0·5 per cent.	1·3 per cent.
Super. guano	17·60 “	5·82 “	1·53 “

In both fertilisers the nitrogen is in the form of nitrates as well as organic nitrogen.

WEATHER AND CROP REPORTS.

AMYTON.—The heavy rains at end of March started all the wheat that was sown, but while some came through well, many paddocks failed to grow on account of the surface of the land caking. Nearly all the seed in such paddocks has perished. Seeding is over and rain has been badly needed for several weeks, although a little over 7in. fell in the middle of May. Feed has made little growth lately owing to dry weather. Stock in fair condition.

BALAKLAVA.—The weather during the past month has been changeable, light showers and spells of warm and dry weather alternating, but the middle of the month was very showery and splendid weather for seeding, the soil being fairly well soaked. Seeding is about finished, and the wheat is coming up quickly. Feed is coming on better than for several years past.

BRINKWORTH.—Seeding is about over, and the rains that have fallen have been very favorable, though a little more at a time would have done more good. The crops that are up show strong healthy growth. Seed and fertiliser drills have been used more extensively this year here.

BURRA (WEST SIDE).—A considerable amount of rain fell about the middle of the month, making about 7in. for year to date. Seeding is progressing rapidly, and the wheat put in in April is looking well. Most farmers are using the seed and fertiliser drill, being well satisfied with results last year from drilled crops. Stock are looking well and lambing promises to be good.

CRYSTAL BROOK.—The month opened dry, but nice rains fell during the third week, and the prospects for the early wheat are more promising. Feed will now make headway, unless cold weather sets in too soon. Farmers have nearly finished seeding, the weather being all that could be desired.

ELBOW HILL.—Seeding is being vigorously pushed on, especially on the loose scrub land. Rain fell in early part of month, but was light and patchy; a good soaking is much needed. In the hills not enough rain has fallen to make the land ploughable. More wheat will be sown in this district than in any previous season.

FINNISS.—During past few weeks we have had nice soaking rains. Feed is growing well and seeding is in full swing.

PORT ELLIOT.—The season opened well, but growth was checked by warm dry weather during April. However this month has altered the aspect, over 4in. of rain being recorded at Hindmarsh Valley, and no frosts experienced. Feed is now growing well, and farmers are able to push on with their ploughing.

KAPUNDA.—Farmers are busy seeding, the weather being very favorable, neither too wet nor too dry. The crops that are up are looking healthy. A disease causing death of poultry is reported, the birds first losing the use of their legs.

LUCINDALE.—Nice rains have fallen this month, and early-sown crops and feed are coming on nicely. Stock in good condition; a number of fats have been forwarded to Adelaide. A large quantity of fertilisers is being used here this year.

MINLATON.—Rainfall for April, 1·31in.; May, to 20th, 1·45in.; total to date, 4·10in. The district has fared very well as regards rain, though the dams have not been replenished. Farmers here now mostly wait for rain before seeding fallow land. A good area has been sown, and seeding is being pushed on. A few early-sown crops are coming up well.

MORPHETT VALE.—Season so far is fairly good. It opened well, but the dry warm weather during April checked the feed severely. Perfect growing weather has been experienced since middle of May, nearly 2in. of rain falling during the week. Pruning of vines has been started. Many early sown hay crops are up nicely and covering the ground.

MOUNT PLEASANT.—Rainfall for April, 0·87in.; for May to date, 1·15in. Stock doing very well for this time of the year, but strangles prevalent amongst horses.

MOUNT REMARKABLE.—The long spell of dry weather retarded the growth of feed very much, but the young wheat stood well. The dry weather broke up about the middle of the month, 1·32in. of rain being recorded. Seeding is about finished, and the early sown wheat looks healthy.

NANTAWARRA.—Stock in fair condition. Young grass is shooting nicely. Lambing is nearly over, and the lambs appear to be doing well. The weather is very seasonable, rainfall 1·28in. for month. Some farmers have finished seeding, but others will not be done for another fortnight. Early sown drilled crops are up and looking well.

NARACORTE.—Season promises well, grass is plentiful, and stock in good condition. Foxes are plentiful and are playing havoc in some parts with young lambs. Seeding is in full swing, and a large area will be cropped under the share system. Rainfall to May 17 over 3in., and very little frost.

PLYM.—Rainfall for four weeks ending May 18, 1·57in. Weather has been favorable to the crops, and feed is plentiful. Wild dogs are numerous and troublesome.

SADDLEWORTH.—Seeding is being pushed on; the weather is more favorable for getting in the seed than for killing any growth on the fallow. Manures are being freely used, the plan of drilling the manure in the autumn and broadcasting and scarifying in the seed later finding favor. A large area will be put under crop. The young feed will help the lambing. Stock in good order.

SWAN REACH.—Nearly 7in. of rain has been recorded for past four months. Feed is very abundant, and unfortunately rabbits, which are plentiful in the district, are thriving and increasing rapidly. Seeding is nearly finished, a large area being cropped this season. Early sown crops are in forward condition. The seed and fertiliser drill is being used by a few farmers here. Stock are generally in good condition.

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

May 31, 1899.

Although no good soaking rain has yet fallen the winter starts fairly, and farmers have had favorable conditions for their seeding, which is about finishing in the districts northwards. Cold nights during the past week or so have somewhat checked the growth of vegetation, but there is an excellent winter supply of feed in the hills, and more especially in the southern districts. To the North, however, the grass is somewhat backward. The rise in price of wool and improved prospects over a good portion of our pastoral country give reason to hope that this important industry is turning the corner towards better times, and that the outlook will lead to the re-occupation of the many grazing properties now abandoned, on which valuable improvements are going to ruin.

Business is steady both in city and country. The opening up of copper mines that had been closed down and new ventures give promise of a marked increase in the production of this metal in the near future.

No effort is being made to move the wheat stocks—calculated at from 60,000 to 70,000 tons—still in growers' hands, although the price is a shade better. Very little business has been done by way of chartering during May, only one small cargo for the Cape that we can hear of. Of course farmers have been busy seeding, and at such a time it is hardly possible to get them to deliver grain freely, still there is a strong disinclination on their part to sell at present prices, the majority being desirous of holding at least until the harvest in the Northern Hemisphere is assured one way or another. This has suited buyers, however, who are not at all inclined to speculate. It is computed that millers are carrying flour for at least two months' local requirements, and as bakers in expectation of lower values are only operating from hand to mouth, all parties seem willing to let the growers hold the wheat stocks. Flour quotations are practically unchanged. The continuance of dry weather in the western portions of Queensland and New South Wales is causing a brisk demand for millers' offal, and has awakened interest in other fodder. Feeding grains are now firmly held.

The endeavor to force up price of potatoes, which we referred to last month, has had the most disastrous results, a further drop of about 15s. per ton having since occurred, whilst consumers are still less inclined to use the local product. The market is being supplied with onions chiefly from the South-East, only a small quantity of locally-grown left. Value has altered but little during the month, and, although there is an inclination to raise price further, the result is hardly likely to succeed with Melbourne quoting £2 10s. to £2 15s. f.o.b., on a 5s. freight.

In dairy produce fair business has been doing, but values in several lines rule slightly easier. Intercolonial markets for butter are lower, and as our colony is not yet quite self-supplying, price here has fallen back in sympathy. The local shortage is being filled by importations of bulk butter by seaboard, and cream overland from Western Victoria; value, however, considering the season, has been ruling satisfactorily for local producers, the Adelaide selling rates being 4d. to 5d. per lb. above Melbourne prices for past three or four months. There is still some spring packed held in refrigerating chambers, but nearly all now is only second grade, and owners are likely to lose money by it. During the earlier half of the month eggs steadily advanced until 1s. 8d. f.o.b. quotation was reached, but Melbourne rates easing back to about 3d. per dozen lower than ours caused a reaction here, so that a drop of about 2½d. has occurred during past ten days. At moment, however, values have apparently steadied, and it is probable that the coming month will see again higher prices. Good business has been doing in cheese; all prime qualities finding ready sale, but old and dry lots have been difficult to quit. Bacon is a shade lower, in sympathy with an easing in the live material, the demand, however, for the time of year is good, and as our values are if anything a shade below intercolonial rates, no further easing should occur. Honey has been moving in fair sized parcels; but still can only be reported as dull, even at present low price. Beeswax selling readily. Almonds very scarce. With the exception of turkeys, which have been very plentiful, well conditioned poultry has been realising satisfactory prices; with the increased supply, however, poor sorts are neglected. Carcass pork and veal are meeting with good competition.

MARKET QUOTATIONS OF THE DAY.

Wheat.—Farmers' lots at Port Adelaide, 2s. 7½d. to 2s. 8d.; outports, 2s. 6d. to 2s. 6½d. per bushel of 60lbs.

Flour.—City brands, £6 10s.; country, £5 17s. 6d. to £6 2s. 6d. per ton of 2,000lbs.

Bran, 9d.; pollard, 9d. per bushel of 20lbs.

Oats.—Local Algerian, 1s. 8d. to 1s. 9d.; good stout white, 2s. 3d. to 3s. 1d. per bushel of 40lbs.

Barley.—Malting, 3s. 6d. to 4s.; Cape, 2s. 3d. to 2s. 6d. per bushel of 50lbs.

Chaff.—£3 5s. to £3 10s. per ton of 2,400lbs., dumped, f.o.b. Port Adelaide.

Potatoes.—Mount Gambiers, £2 18s. to £3 2s.; Tasmanians and New Zealand, £3 2s. 6d. to £3 7s. 6d. per 2,240lbs.

Onions.—£4 12s. 6d. to £5 per 2,240lbs.

Butter.—Creamery and factory prints, 11½d. to 1s. 1½d.; dairy and collectors' lines, 9½d. to 11d. per pound.

Cheese.—S.A. Factory, best, large to loaf, 6d. to 7d.; ordinary to fair 4½d. to 5½d. per pound.

Bacon.—Factory-cured sides, 6½d. to 7½d.; farm lots, 6d. to 6½d. per pound.

Hams.—S.A. factory, scarce, 7d. to 9d. per pound.

Eggs.—Loose, 1s. 4d.; in casks, f.o.b., 1s. 6d. per dozen.

Lard.—In bladders, 5d.; tins, 4d. per pound.

Honey.—2d. for best extracted, in 60lb. tins; beeswax, 1s. 0½d. per pound.

Almonds.—Soft shells, 4d.; kernels, 10½d. per pound.

Gum.—Best clear wattle, 1½d. per pound.

Poultry.—Good table roosters, 1s. 4d. to 1s. 7d. each; medium cockerels and mixed fowls, 1s. to 1s. 3d.; ducks, 1s. 8d. to 2s. 4d.; geese, 3s. to 3s. 6d.; pigeons, 6d.; turkeys, from 4½d. to 5½d. per pound live weight for fair to prime table birds.

Carcass Meat.—Prime shop porkers, 4½d. to 5½d.; baconers, 4d. to 4½d.; medium quality and heavy weights, 2d. to 3d.; vealers, 1½d. to 2½d. per pound.

MONTHLY RAINFALL.

The following table gives the rainfall for May:—

Adelaide	3.08	Riverton	2.37	Callington	1.32
Wilson	0.68	Tarlee	1.67	Langhorne's Bridge..	1.65
Quorn	0.73	Stockport	1.33	Milang	2.49
Port Germein	1.59	Hamley Bridge	1.69	Walleroo	1.37
Port Pirie	0.68	Kapunda	1.82	Kadina	1.95
Crystal Brook	1.56	Freeling	1.94	Moonta	1.82
Port Broughton	1.78	Stockwell	1.35	Green's Plains	1.89
Hammond	0.77	Nuriootpa	1.93	Maitland	3.06
Bruce	0.73	Angaston	2.58	Ardrossan	1.83
Melrose	2.10	Tanunda	2.27	Port Victoria	2.41
Wirrabara	2.09	Lyndoch	2.54	Curramulka	1.86
Appila	1.24	Mallala	1.97	Minlaton	2.22
Laura	1.61	Roseworthy	1.76	Stansbury	0.96
Callowie	1.21	Gawler	2.70	Warooka	1.77
Jamestown	1.21	Smithfield	2.37	Yorke town	1.71
Gladstone	1.42	Two Wells	2.00	Edithburgh	2.07
Georgetown	1.67	Virginia	2.91	Fowler's Bay	2.54
Narridy	1.74	Salisbury	2.40	Streaky Bay	2.16
Bedhill	1.50	Teatree Gully	3.69	Port Elliot	3.26
Koolunga	1.33	Magill	3.69	Port Lincoln	3.04
Carrieton	0.74	Crafers	5.18	Cowell	1.38
Eurelia	0.86	Clarendon	4.64	Queenscliffe	2.11
Black Rock	0.71	Morphett Vale	2.67	Port Elliot	2.12
Petersburg	0.72	Noarlunga	1.66	Goolwa	2.42
Yongala	0.62	Willunga	2.80	Meningie	4.08
Terowie	0.66	Aldinga	2.17	Kings' on	3.16
Yarowie	0.63	Normanville	2.68	Robe	1.97
Hallett	1.05	Yankalilla	2.95	Beachport	2.60
Burra	1.99	Eudunda	1.54	Bordertown	2.12
Snowtown	1.57	Truro	1.61	Wolseley	1.57
Brinkworth	1.74	Mount Pleasant	2.33	Frances	1.82
Blyth	2.02	Blumberg	3.28	Naracoorte	3.14
Clare	3.21	Gumeracha	4.85	Lucindale	2.93
Mintaro Central	2.75	Lobethal	4.05	Penola	1.83
Watervale	3.65	Woodside	3.44	Millicent	3.50
Auburn	2.93	Hahndorf	3.37	Mount Gambier	4.57
Manoora	1.67	Nairne	2.44	Wellington	1.80
Hoyleton	2.33	Mount Barker	3.49	Murray Bridge	1.36
Balaklava	1.82	Echunga	3.59	Mannum	0.83
Port Wakefield	1.84	Macclesfield	3.13	Morgan	0.53
Saddleworth	1.55	Meadows	4.71	Overland Corner	0.93
Marrabel	2.14	Strathalbyn	1.88	Renmark	0.68

BRITISH DAIRY IMPORTS.—The imports into the United Kingdom of duty-free articles of food and drink during 1898 increased to the extent of nearly fifteen and a half millions sterling over the 1897 imports. For the first time for many years the imports of dairy produce show practically no increase; the total quantity is actually less, with a slight increase in value. In butter the imports show a falling off of 8,709cwts. compared with the previous year, when 3,217,802cwts. were imported. Denmark shows an increase for the year of about 130,000cwts., and her total is very little short of half the total importations. Canada also increased the quantity sent, as did New South Wales, the latter sending 34,391cwts. as compared with 7,777cwts. in 1896. All other countries show a falling off to a greater or less extent, the United States total being only about 40 per cent. of last year's. Cheese shows a falling off of over a quarter of a million hundredweights, total 2,339,452cwts.; all the principal senders showing a deficiency. In margarine there is a falling off of nearly 40,000cwts., but the trade in this article still represents a value of over two millions sterling. Condensed milk to the value of £1,435,915 was also imported, but the figures for fresh milk are not available.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, MAY 17, 1899.

Present—Messrs. Thos. Hardy (in chair), Samuel Goode, W. C. Grasby, M. Holtze, H. Kelly, Thos. Price, T. B. Robson, and Acting Secretary.

Phylloxera.

It was decided to urge on the Minister of Agriculture the necessity for posting in prominent situations notices warning travellers of the prohibition against the importation of vines, fruit trees, &c., from the adjacent colonies.

The ACTING SECRETARY reported that the Minister had authorised the fumigation of all plants imported into the colony.

Stinkwort.

Mr. HARDY called attention to the apathy of the farming community as regards the spread of stinkwort. Although this weed could not now be altogether eradicated, much could be done to lessen the loss caused by it. It could be turned to good account if it were turned under while green. He had seen stinkwort 3ft. in height turned right under by means of a single-furrow plough with an old mould-board swung on to trail on the weed and force it under. A neighbor at McLaren Vale had kept the stock off some infested land, and allowed the grass to grow. When it became dry enough he set fire to it, and so destroyed the stinkwort just as it started to flower. As far as he could see the farmers in the south had ample time at the end of the summer to take some steps to get rid of the weed.

Mr. GOODE said nothing was better than a chain-drag to pull this and other tall rubbish under the plough. To turn the stinkwort under before it had matured would enrich the land.

Mr. KELLY said he noticed in the *Australasian* that someone had stated that he kept some thousands of sheep alive on the stinkwort during the drought. Heavy stocking would keep the plant down, and prevent it getting woody. Stock would, however, only touch it when nothing else was available. The plants could be turned under with two or three furrow ploughs with heavy bullock chains running close to the mouldboard.

Members thought sheep or other stock would need to be in very bad straits before they would eat stinkwort, and that cultivation would get rid of it as well as improve the land. It was thought that improved methods of cultivation would in time dispose of the trouble, except on grass land.

Extracts and Translations.

The CHAIRMAN tabled the following extracts and translations from Foreign Agronomical Papers:—

295. *Feijoa Sellowiana*.—Mons. Andrée, a French botanist, discovered in La Plata, South America, this new fruit tree, which is now cultivated in Southern France. It grows to a height of from 9ft. to 15ft., and bears an oblong egg-shaped green berry, 2in. to 2½in. long, and 1in. to 2in. broad. It is sweet, contains much juice, which is much liked, and tastes like pineapple.

296. *Square-pod Pea* (*Lotus tetragonolobus*).—Produces an unusual quantity of herbage (in Italy highly valued for sheep), from 24 tons to 26 tons per acre, equal to 5 tons of dried hay. It is also suitable for a green manure crop where it finds enough moisture. Its nitrogen percentage is less than that of lucern, but its aggregate nitrogen product is nevertheless greater, and more than twice as great as with burr clover. It develops very quickly, requires not much moisture to grow, and my own experience in the garden is quite as favorable as the above.

297. *To Keep Apples and Pears in ground turf or stringy peat is now found superior to any other method.* The fruit acquires no taste from it if packed into it without paper, and keeps for many months. In a big cask put 2in. of the ground-peat at the bottom, and place the fruit in layers, mixed with peat; 1cwt. of fruit will require about 10lbs. of dry peat.

298. *Up to What Age will Mares Bring Foals.*—To know this may be of value where the mares bring good stock. According to the English Stud Book, those foals born by aged mares are generally the best. No mare foaled after the 29th year; but with 20 years the Stud Book records yet 226 foals from 1,000 mares stinted; with 21 years, 175; with 22 years, 141; with 23 years, 83; and thereafter the number of foals is very small.

299. *Texas fever.*—In a report from Professor Koch, in the German Colonial Paper, it is stated that he took the ticks from cattle that, although infected, were apparently healthy, and also others from a calf which had the fever in the highest degree. He put the ticks separately into glasses, closed them with wadding, and in a few days they laid their eggs, from which he succeeded in keeping several hundreds of young ticks alive during a march of two weeks. These were put on to cattle from the interior that never came near to infected cattle. On two of them those ticks raised from those taken from the calf were placed, and on two others those taken from the ticks taken from seemingly healthy cattle. In about three weeks some of the ticks were fully grown, but none of the four which had received them did show any disease. On the twenty-second day, however, an analysis of the blood of the cattle that had received the ticks from the calf showed the presence of the disease. With the blood of these two cattle he inoculated four healthy cattle, which became ill on the fifth day. Thereupon two other cattle and the four that received the ticks were inoculated with 20ccm of the blood, and the former as well as two of the others that at the first attempt remained healthy showed now symptoms of the disease. The two others which became slightly infected when previously receiving the ticks now remained healthy. No parasite could be detected in their blood. It is now clear that young ticks that themselves did not come into contact with diseased cattle, but are descendants from ticks on diseased cattle can produce the fever; and also that cattle having passed through only a slight attack of the fever enjoy thenceforth a perfect immunity. To transfer the form of the fever, which is deadly, within a short time was not a success. The cattle which proved their immunity under the above experiments are now to be sent to the infected districts to see whether they will there remain healthy notwithstanding natural infection.

296. *Exhibition of Potatoes at Halle for the Province of Sachsen, Prussia.*—One-seventh part of the area under cultivation is planted with potatoes. In 1898 38,952,000cwt. were harvested. Besides the seven large collections by the several breeders of new sorts of potatoes, sixty-eight farmers exhibited, and the Professor Maercker potato appeared thirty-five times, beating all others. As an early potato "July" was preferred to all (of which I received, through Mr. Orth, of Oldenburg, three by the February mail). During the last few years many new varieties have been raised from seed which must supplant all others on account of the large crops that can be obtained from them (at least 50 per cent. more), if they get sufficient nourishment. They are also less subject to disease, and contain 1 ton per acre more starch. Professor Maercker has now given the manuring of many of these new sorts much attention at the experimental station at Lauchstaedt, and his long report is here condensed. He obtained from "Silesia" 203cwt. per morgen (somewhat more than half an acre), and from "Professor Maercker" 186cwt. A peculiarity of the more modern potatoes is that they require much phosphoric acid, and they also have an inordinate high growth above ground. "Silesia" had 140cwt. of top per morgen, and was more than 6ft. high; "Hero" also had 135cwt. of top, and I have the above and others now 4ft. 10in. high. A crop of 200cwt. of potatoes and 100cwt. of top will require 17lbs. of nitrogen, 159lbs. of potash, and 48lbs. of phosphoric acid per morgen, or, where the soil will not permit a larger crop than 150cwt. of tubers and proportionately less top, an acre will still demand about 160lbs. nitrogen, 200lbs. of potash, and 66lbs. of phosphoric acid. Without a phosphatic fertiliser 85cwt. of tubers were grown per morgen, 28·6lbs. of phosphoric acid more would have been in 200cwt. of tubers, and as it is not likely that more than 50 per cent. of the phosphoric acid in any fertiliser could be used by the crop, more likely less than 33 per cent., it would have required several hundred-weight of superphosphate or Thomas phosphate to increase the crop, as the Professor has it, about half a ton per acre, unless you manure very heavily with farmyard dung. Without a potassic fertiliser a crop of 108·5cwt. of potatoes per morgen was grown. To obtain 91½cwt. more, 72·7lbs. of potash ought to have been available. In 200cwt. of farmyard dung about 80lbs. of potash may be available out of 120lbs. in the manure, and this produced at Lauchstaedt the 203cwt. of tubers from the Silesia potato. Without a nitrogenous fertiliser a crop of 88·5cwt. of potatoes per morgen was grown. To increase the crop to 200cwt. it would require about 6·45cwt. of nitrate of soda per morgen, for 200cwt. of farmyard dung will not supply sufficient nitrogen. Green manuring, however, does much better, producing as many as 135cwt. of tubers. Professor Maercker winds up by stating that, with fair soil, it is not possible to supply so much plant food to obtain the highest crops of potatoes by means of artificial fertilisers. If kainit and nitrate of soda in so large quantities be used, it would

interfere with the starch, and be unfavorable as to the mechanical state of the soil. The nitrate of soda is also favorable to the appearance of disease in the tubers. A cheap muriate of potash, containing 40 per cent. of potash, would be of great advantage for the growth of potatoes [And will now be placed on the market.—CH. AGL. B.]; but to obtain the largest crops manuring with about 360 cwt. of farmyard dung per acre will be necessary, together with phosphatic and potassic fertilisers, to add more phosphoric acid and potash. He is not certain whether he can recommend an addition of nitrate of soda, although he does so to supplement green manuring together with a not too small addition of phosphatic and potassic fertilisers.

New Branch.

The formation of a Branch of the Bureau at Wandearah, with the following gentlemen as members was approved:—Messrs. Messrs. Geo. Robertson, J. Kurl, G. Collins, W. J. Fuller, W. Halliday, A. E. Pyman, W. Munday, L. Stanley, E. H. Eagle, R. J. Dennis, C. Birks, T. Joyce, and E. Jacobs.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Clare, Mr. H. J. Yelland; Caltowie, Mr. R. J. Neale; Riverton, Mr. H. Davis; Mount Remarkable, Mr. J. H. Girdham; Crystal Brook, Mr. A. Hamlyn; Tatiara, Mr. R. Penny; Forster, Mr. A. G. Prosser; Mundoorra, Mr. W. H. Mitchell; Bowhill, Messrs. Geo. Knight and A. Tyler; Mount Bryan East, Mr. W. Dare; Kadina, Mr. F. H. Warren; Belair, Mr. E. Crane; Redhill, Mr. F. C. Wake.

Reports by Branches.

Acting Secretary reported receipt of fifty-nine reports since previous meeting.

REPORTS BY BRANCHES.

Renmark, April 20.

Present—Messrs. W. H. Waters (Chairman), W. H. Harrison, R. Kelly, Captain Moffat, F. S. Wylie, M. Chapman, J. L. Gubbins, R. V. Bostock, and E. Taylor (Hon. Sec.).

MANURING OF VINES.—Professor Perkins' article on this subject in April issue of *Journal of Agriculture and Industry* was read, and a long discussion ensued.

ANTS.—Members wished to know best way to get rid of "soldier ants," which are becoming very troublesome. [Sprinkle Paris green or other arsenical poison about their entrance to the nests.—GEN. SEC.]

Richman's Creek, April 24.

Present—Messrs. W. Freebairn (Chairman), J. J. Gebert, A. Knauerhase, J. J. Searle, W. Rodgers, A. Nicholson, W. J. Wright, P. J. O'Donohue, J. M. Kelly, and J. McColl (Hon. Sec.).

DISTRESSED FARMERS' FUND.—The paper read at Strathalbyn Conference by Mr. R. Caldwell, M.P., was read and discussed. While it was admitted that a good deal of country under cultivation in some parts of the North was unsuitable for farming, and should be held in larger blocks for grazing, members were of opinion that a permanent relief fund on the lines suggested by the joint committee would, if wisely administered, prove of great assistance to many in times of need. Members expressed the opinion that the years of adversity they had experienced had taught useful lessons which they would derive benefit from

in years to come, and that the comparatively fair position of so many of their farmers to-day, after so many years of drought, proved that they were well able to adapt themselves to circumstances, and to make the best of things.

BLUESTONE.—Several members stated there appeared to be a lot of inferior bluestone on the market, and it was not always easy to detect the same.

RAINFALL.—Recorded by Mr. Freebairn, for February, 1·04in., March, 0·89in.; by Messrs. A. & J. McColl, February, 1·08in., March, 1·16in.

Crystal Brook, April 22.

Present—Messrs. Geo. Davidson (Chairman), W. J. Venning, W. Hamlyn, R. Pavy, J. F. Bryson, W. Natt, W. Morrish, and Geo. Miell (Hon. Sec.).

DISTRESSED FARMERS' FUND.—A resolution, "That, in the opinion of the Branch, a permanent relief fund is not desirable," was carried, a majority of the members being of opinion that it would be a mistake to attempt to keep farmers on land that had proved unsuitable for farming, and that it would be better to help some to remove to districts with a more reliable rainfall.

Mount Bryan East, April 22.

Present—Messrs. W. Bryce (Chairman), W. Quinn, H. Wilkins, J. Prior, T. Best, T. Wilks, A. Pohlner, and E. T. Prior (Hon. Sec. *pro tem.*).

FARMERS' RELIEF FUND.—Members are in sympathy with the objects of this fund, but are not in a position to help.

APHIS ON CABBAGES.—A member was advised to spray his aphis-infested plants with a decoction of tobacco in soapsuds; boil 2ozs. tobacco with 3ozs. soap (sliced) in 1gall. water.

BUNT.—Mr. Bryce rubbed bunt balls with seed wheat, then pickled one-half of the grain so treated and sowed side by side with the unpickled seed. Result—Pickled seed gave a perfectly clean crop, but that unpickled was nearly all bunt.

ROLLING.—One member recommended that light soils should be rolled directly after seed is sown; but most members agreed that rolling before the seed is up is not good in this district.

Watervale, April 24.

Present—Messrs. C. A. Sobels (Chairman), E. Castine, L. Buring, S. Solly, and E. E. Sobels (Hon. Sec.).

OFFICERS.—Mr. E. E. Sobels tendered his resignation as Hon. Secretary on account of his absence from the district, and was accorded a vote of thanks for his past services. Mr. E. Treloar was elected Hon. Secretary, and C. A. Sobels, re-elected Chairman.

CULTIVATION.—Mr. L. Buring read the following paper on "Importance of Cultivation of Growing Crops":—

In order that any growing crops may be both practically and profitably cultivated, they must have been either drilled in or planted out in rows sufficiently wide apart to allow the soil between being worked by horse power. On the continent of Europe, where labor is so much cheaper than in our colony, and where girls and boys can be obtained to hoe for 1s. and less per day, one does not see many horse hoes used for tilling in between the rows of growing crops. In fact, in many places, where such intense cultivation is carried on as in Europe, the extent of land under culture is so comparatively small that they would not go to the expense of buying such tillage implements; and then, as long as the work is done by hand, and properly, a better cultivation is still obtained. In South Australia all summer fodder, as

maize, sorghum, &c., would profit by a tillage once or twice during their growth, according to the season. Why should such crops be cultivated when growing? may be asked. In the first place, we all know what a beneficial effect the action of the air has upon the soil; not only that, but it is absolutely necessary for it to penetrate the soil, because the roots require it, so as to live in good health and be able to carry out their duties properly. Again, it is a known fact that, if the soil is left unworked for any length of time, gradually a great number of capillary tubes form in the soil, and by means of them water from the subsoil is drawn upwards, and evaporates when it reaches the surface. If, now, the top soil is disturbed, and these tubes are broken, the water cannot escape, and though top soil may be drier, that around the roots contains sufficient moisture to keep them supplied for a considerable time. It has been shown that there are myriads of bacteria in the ground which help in bringing about changes in the soil useful for the plant. Now, these bacteria can only be healthy and multiply plentifully in the presence of large quantities of air. The looser a soil is, therefore, the more rapidly will they get their supply of air, and the greater will the influence be which they have in the soil. Loose and moist soils have the property of abstracting ammonia from the air, but in only such infinite small quantities that it can hardly be of practical importance, since we can add this factor in artificial manures. If summer crops are to be followed by wheat or other cereals a tillage during period of growth will act in the same manner as if the land were under bare fallow. The weeds will be kept in check, and the soil will receive in every way the advantages of bare fallow. Of course it will lose what is taken out of the soil by the crop, but if the crop is fed off on the place this loss will not be so considerable. For crops such as mangolds, potatoes, &c., which are left over summer, cultivation is very necessary, to keep down the weeds and to keep the soil loose and moist. Especially is this necessary for potatoes.

Port Elliot, April 22.

Present—Messrs. P. O. Hutchinson (Chairman), J. Brown, J. McLeod, F. T. Fischer, W. E. Hargreaves, H. Green, and E. Hill (Hon. Sec.).

FARMERS' RELIEF FUND.—Whilst not in favor of the proposed permanent fund, this Branch would do all in its power to relieve present need. They believe that the only satisfactory way to relieve some of the distressed farmers would be to remove them from their present holdings, and to find more suitable homes for them; much of the land at present occupied for farming can never be profitably used for that purpose, and should be thrown into larger blocks for grazing.

Golden Grove, May 3.

Present—Messrs. T. G. McPharlin (Chairman), S. A. Milne, H. Bowey, J. Ross, R. Smith, D. Smyth, J. Woodhead, and A. Harper (Hon. Sec.).

FARMERS' PERMANENT RELIEF FUND.—A motion was unanimously carried "That this Branch is not in favor of a permanent fund for relief of distressed farmers." The opinion is held that it would be quite useless to try to keep farmers on land where the ultimate chance of success is so very remote.

HORSE-BREEDING.—Mr. Ross read a criticism on a paper read before another Branch, and an animated discussion was evoked thereby.

Tatiara, April 22.

Present—Messrs. Thos. Stanton (Chairman), R. Scown, E. Prescott, and W. E. Fisher (Hon. Sec.).

FARMERS' RELIEF FUND.—Members expressed the opinion that, as the Branch had already failed to get the residents of the district to show any interest in the matter, it was useless re-opening the question. Some residents of the South-East would rather assist to help the farmers to leave the Northern districts which have proved unsuitable for farming operations.

MEETINGS.—The Hon. Secretary complained of the apathy shown by some of the members, and the lack of interest in the meetings. There were many things appearing each month in the *Journal of Agriculture* that they might discuss with advantage, and the members should make it their duty to attend regularly.

Burra, April 29.

Present—Messrs. F. H. S. Field (Chairman), Jos. Flower, F. Duldig, E. Goodridge, W. G. Hawkes, Hon. J. Lewis, M.L.C., and R. M. Harvey (Hon. Sec.).

SHEEP ON THE FARM.—The Chairman read a paper on this subject, to the effect following :—

With wheat at 2s. 2d. per bushel, and hay at 30s. per ton, it does not pay to confine operations to those two items. Every farmer ought to keep a few sheep, as they will save a lot of work on the fallows during the summer. A flock of sheep will clean as much fallow in one day as a man, a team of horses, and a scarifier would do in a week, and do the work better, because they will pick up all the weeds alongside the fences and in the corners that would go to seed otherwise, and blow over the paddock ready to grow up with the wheat. Some, if not all, of the paddocks must be sheep-proof, as he did not approve of shepherding the animals. If shepherded they ought to be put in a small paddock at night, not in a yard. Sheep must be well looked after, and it will be found that mongrels will eat more feed and give less profit than good ones. The farmer should breed his own flock. His experience showed that merinos are the best, and it is easy to get a few good ewes to commence with. Many people think that sheep reared on cultivated land do not produce such good wool as upon land that has never been broken up, but that depends upon the kind of sheep. In October, 1897, he put a lot of merino ewes on a paddock which had all been cultivated—one sheep to one and a half acres—and left them there till October, 1898. There was 75 per cent. of lambs, and the ewes averaged 10lbs. of wool, which brought 7d. per lb. in Adelaide, which shows that the farmer can grow as good wool as the squatter if he goes the right way about it. In addition to wool there is mutton for the household and a few lambs and surplus sheep for market. It is much better to keep fewer sheep than to overstock the pasturage.

Arden Vale, April 24.

Present—Messrs. A. Hannemann (Chairman), M. Eckert, M. Searle, D. Liebrich, A. W. Fricker, F. Schuttloffel, G. W. Willis, L. Warren, G. Miller, and E. H. Warren (Hon. Sec.)

BUNT.—Mr. Fricker read a paper to the following effect :—

Although some people declare that bunt in wheat is evidence of slovenly farming, these conditions prevail every year, and last season some of the most successful farmers suffered most. It appears to be correct that certain climatic conditions are favorable to the development of bunt. The spores of the parasitic fungus must be on the grain, or left on the ground from the last crop. [If on the ground, the first rain would cause the spores to start growing, and the fungus would die of starvation.—GEN. SEC.] If wheat is sown without all the bunt spores being destroyed, bunt in the crop will result. Previously he had not considered pickling a complete cure for bunt; but, after noticing several farms very free from bunt, he found that the rule was to discard any seed that was not perfectly clean, and then carefully treating seed with bluestone. During the last year an exchange of seed was procured; which, although showing no sign of bunt, and treated in the usual way, yet was found to be bunted at harvest time. We must conclude that the seed was infected with the minute spores of the fungus, and that the mode of pickling was not effectual. Last year crops which appeared to be bunted were apparently clean after being winnowed: but really the bunt-balls were broken and dispersed in winnowing. He was convinced, from experiments last year, that it is a sound principle to soak all seed for at least thirty or forty minutes, in a 2 per cent. solution of bluestone, equal to 1lb. per bag. Last year he pickled some seed on a floor with 1lb. bluestone to the bag; but on breaking some of the bunt-balls, found the peculiar smell still evident, the pickle not having penetrated through, and there was bunt in the crop. He also used 1lb. bluestone per bag of seed, with similar result. Having four bags of seed which was one-third bunt; but which he still desired to sow, he treated it for forty minutes with the 2 per cent.

solution, and found that the Professor of Agriculture was quite right in saying that proper pickling is a perfect preventive of the pest, as the crop was quite free from bunt. For comparison, he sowed apparently clean wheat alongside, without pickling it, and had bunt in the crop. Any bunt-balls not killed will be crushed by the seed-ower, and the spores will be distributed amongst the seed wheat, and thus the seed will be infected.

Mr. Searle thought that if bluestone were an effective remedy bunt would have been annihilated ere now. A new idea was to damp the seed with a solution of $\frac{1}{2}$ lb. bluestone to 4 galls. water, and let the bunt germinate in the bag of seed. Since adopting this plan he had not been troubled with bunt. Mr. Eckert said he used 3 lbs. sulphate of copper (bluestone) dissolved in 4 galls. water for three bags wheat. Mr. Schuttloffel said in Russia farmers use a pickle compounded of urine, bluestone, and lime, sometimes leaving the seed in pickle for three days. Mr. Williss used $\frac{1}{2}$ lb. to 4 bush. seed, and Mr. Liebich steeps his seed in a hot solution of bluestone with good results.

Holder, April 22.

Present—Messrs. F. A. Grant (Chairman), F. Rogers, J. Rossiter, F. Slater, E. Crocker, J. Rowe, W. Watt, H. Blizzard, H. Vaughan, J. Green, and J. J. Odgers (Hon. Sec.).

FLORIDA VELVET BEAN.—Members reported plants grew very little during the hot weather, but with the cool change they made a start, and have grown well since, podding freely.

HOMESTEAD MEETING.—Mr. Vaughan showed members round his block, on which he had been residing for about eight months. Members considered the block a practical object lesson of the splendid results obtained by intelligent cultivation and irrigation.

Kanmantoo, April 27.

Present—Messrs. Thomas Hair (Chairman), J. Downing, W. G. Mills, J. Mullins, F. Lehmann, P. Lewis, Thomas Hawthorne, H. Werner, A. D. Hair (Hon Sec.), and two visitors.

FOREST CULTURE.—The Chairman read a paper on this subject to the following effect:—

It is scarcely possible to overrate the importance of forest conservation to the present and future generations of this colony. Whether from a financial point, or in the light of health, or from any other point of view, it will be immensely profitable to consider this subject in all its bearings at this present time, when tree-planting should be vigorously taken in hand by all land owners and occupiers. Judging from the rate at which South Australia's very limited timber area has been destroyed during the past fifty years, it does not require any great power of prophecy to predict that at the end of the next fifty years timber trees will be very scarce, and wood very dear. Fences have been replaced already two or three times; but this renewal cannot go on for ever unless steps are taken to replace our denuded forest lands with trees. What are we to do for firewood in the near future? Already in several localities where wood was once abundant, firewood has now to be procured from many miles distance; and yet next to nothing is being done towards providing for the future. There are people who say "Let the future provide for itself," and yet they are inconsistently providing for posterity by adding section to section, house to house. How much better would it be if they would plant a few acres of eucalypts or other timber trees in the corners of their paddocks and different parts of their estates. This would beautify the country, provide shelter for the stock in winter, and shelter from the sun in summer, besides providing timber for all purposes, ameliorating the climatic conditions, conserving moisture and water supplies, and enhancing the feeding capacity of the land. He sometimes thought it might be advisable for the Legislature to provide means to secure the planting of large portions of many of the large landed estates with timber trees. During the winter of 1890, he planted five or six acres with sugar gums (*Eucalyptus corynocalyx*). When the ground was in good condition he put on two single-furrow ploughs, the first with the mouldboard to turn over the sod, 9 in. deep, and the

other following in the same furrow without the mouldboard, and breaking up the subsoil 6in. deep, using three horses to each plough. The Forest Department supplied 3,500 trees, which were planted during showery weather, and came on splendidly for a few weeks, until myriads of locusts came and destroyed more than half. Next year the vacancies were filled with fresh trees, but the spring of 1891 was rather dry, and the trees had to be watered a few times. For two or three years the ground was ploughed and weeds kept down. The trees thrived well, and sheep were then put in to keep down weeds. The trees are now 30ft. to 40ft. high, with a girth of 42in. The plantation is one of the charming spots of the locality, and is often used by picnic parties.

Mr. Mills thought belts of timber across the paddocks would have the effect on the hills of preventing the loss of the droppings from stock and the blowing away of the soil, leaving bare the roots of grass. Where the soil was blown away the grass died out, and it did not usually grow again on these patches. Some of the members were of opinion that belts of timber across the country would help to lessen the effects of the hot blasts which sweep across the district in the summer months.

PASTURE.—Mr. Mills stated that as an experiment he had sown some English grasses on stubble land this month, to see, if possible whether any would stand during the dry part of the year. The Chairman said he planted cocksfoot and prairie grass some time ago amongst his fruit trees. Where shaded by the trees it grew very well, but in places less shaded it died off. Mr. Lehmann said lucern would flourish in the district if it gets thoroughly flooded once in two years. Mr. Downing advised sowing lucern in July, as it then got good hold before the hot weather set in. Mr. Mullins found rib-grass grew on almost any stubble land in the Bremer district, and thought it the best grass for them to grow.

Mundoora, April 21.

Present—Messrs. R. Harris (Chairman), A. McDonald, W. Aitchison, T. Watt, J. Blake, G. Haines, W. J. Shearer, J. J. Vanstone, A. E. Gardiner (Hon. Sec.), and one visitor.

HORSE-BREEDING.—In discussing Mr. Ross's paper, read at Golden Grove, Mr. Blake considered that, on the whole, horses have deteriorated in South Australia, and that the course recommended by Mr. Ross would make the matter much worse. Horse-breeding is of much importance to farmers, and something should be done to encourage the breeding of improved draught stock. Mr. Hains said he was not at all satisfied with the results which followed his efforts to rear a few young colts for his own use. He detailed some of his bad experiences with a noted prize-taking stallion. Mr. Haines also recounted similar results from services of a prize-taking horse which travelled over a large district, and he attributed bad results to overtaxing the powers of the horse. Mr. McDonald referred to a horse named "Little Fish," which at first was rather despised and neglected on account of his appearance, but his stock were the first at all shows, and were to be found in harness, as hacks, and as jumpers. He thought the reason was that the horse had a good constitution, and was not overtaxed. The Hon. Secretary had noted that chance foals often made good horses. Members thought the reasons for this were that the horse and filly were in such cases generally young, were at large, and had plenty of exercise and natural food. It was generally concluded that stallions for hire should be examined and certificated by a qualified veterinary surgeon.

PICKLING SEED WHEAT.—Mr. Aitchison said he had used strong salt water for pickling, with satisfactory results. Mr. Haines said a friend of his lost several hundred pounds through pickling with salt, as the crop was badly bunted.

CHANGE OF SEED.—Members appear to be convinced that change of seed from localities differing in character is beneficial, and some instances were brought forward in support of this contention. They are convinced also that too much attention cannot be given to the choice and preparation of seed.

Port Germein, April 29.

Present—Messrs. G. Stone (Chairman), W. Crittenden, W. Head, W. Mortess, A. Thomson, W. Broadbear, I. Jarrett, J. R. Gluyas, E. McHugh, J. K. Deer, and A. H. Thomas (Hon. Sec.).

BREEDING.—Considerable discussion took place on "Does Like produce Like in Nature" in regard to stock-breeding. Members thought stock generally took more after the sire, that only the best tempered animals should be bred from, and that no stock with any marked defect should be used for breeding purposes. The cross between the Poland-China boar and Berkshire sow was recommended by members as suitable for farmers.

Bowhill, April 22.

Present—Messrs. W. Towill (Chairman), J. Waters, J. McGlashan, C. Drogemuller, W. Plummer, and H. H. Plummer (Hon. Sec.).

FARMERS' RELIEF FUND.—Members approved of suggested relief fund, and several alterations were suggested in the proposed rules.

BUNT.—Mr. Towill reported having sown his Purple Straw wheat last season without pickling because it was quite free from bunt, the result being that the crop was affected. The other seed he pickled, and had a clean crop. It was necessary for the farmer to be sure to use only pure bluestone, and they would do well to stick to recognised brands.

POULTRY.—Mr. W. Plummer read a paper from April issue on this subject, as read by Mr. Monfries, at Gumeracha, and considerable discussion ensued. Mr. McGlashan thought they had great opportunities on the river districts for poultry, owing to favorable climatic conditions. He advocated a cross between the White Leghorn and the common fowl for egg production; two years was long enough to keep a fowl for laying purposes. The Chairman thought nothing paid better on the farm than well attended poultry. A too frequent mistake made was in overcrowding the yards, rendering it impossible to secure proper cleanliness. For every 5s. laid out for food he got an income of 15s. from his fowls. He did not favor pure-bred fowls, except for crossing. Mr. Drogemuller agreed, and found the cross between the Dorking and Brown Leghorn produced the best layers. Every second year a change of blood should be secured.

EARLY FARMING AND PRESENT FARMING.—Mr. Dohnt read a lengthy paper, in which he recounted his recollections of the method of farming over forty years ago, and compared those times with the present period. The old wooden plough without wheels, drawn by bullocks; the sickle and reaphook; the flail, rollers, treading-ring, and thrashing machines for thrashing out the wheat; and many things now almost forgotten were brought into notice. A pair of working bullocks then cost from £30 to £40, and a good draught horse sold at £90 to £100. From 15s. to 25s. per acre was paid for reaping with hook or sickle, and wheat sold at 15s. to 20s. per bushel. Farmers used to unite and help each other to gather in their crops, and to cart and thrash out the grain. Gradually improved forms of ploughs and all other farm implements came into vogue, until the present perfected patterns came into use.

ploughing is not so common with the present multiple implements as it was when the single-furrow plough was in use, and our young people are not so competent in this respect as the young men were in the olden times.

TREATMENT OF HORSES.—Mr. Dohnt read a paper on this subject, in which he drew attention to the necessity for attention to the proper treatment and use of harness, as neglect in these particulars will cause sore shoulders. By proper treatment horses with sore shoulders may even be worked and yet be cured. The horses should be regularly and thoroughly groomed, and the collars cleaned twice or three times a week. Before putting a new collar on a horse, soak it well in water, and then put it on and work the horse in it for a day. It is good to bathe the shoulders often with cold water. Do not trust an impulsive, indiscreet person to drive a team, as he is apt to ill-treat or knock the animals about. It is better to pay a fair wage to a good, careful man than to employ a careless, irresponsible youth to drive the team. When the horses have finished their day's work they should be well groomed, have a small feed, and about 9 o'clock fill their mangers with chaff or hay, and bed them down. At 4:0 a.m. next day feed and groom them again, and clean up the stable. A great deal more consideration should be given than is given to the comfort and care of our working stock.

Meadows, May 9.

Present—Messrs. J. Catt (Chairman), W. Pearson, G. Rice, W. J. Stone, H. V. Wade, W. A. Sunman (Hon. Sec.), and three visitors.

HAY CROPS.—After discussion, members decided that the best mixture for a "Farmer's Own Hay Crop" is White Tuscan wheat and Algerian oats. As they ripen best together (and the oats are bitter unless dead ripe), and the wheat is nice and green and sweet by the time the oats are fully ripe, the combination makes excellent hay. Mr. Pearson thought Cape oats and Purple Straw wheat a good mixture. For ensilage, peas and Cape barley were considered best.

Elbow Hill, April 28.

Present—Messrs. E. Wake (Chairman), C. G. Ward, J. Rehn, W. Spence, H. Dunn, J. Elleway, W. Beinke, J. Foulds, F. J. Brooks, C. L. DuBois, H. J. Styles, G. Wheeler (Hon. Sec.), and five visitors.

EXPERIMENTAL.—Mr. DuBois distributed parcels of Grey's Early and Hawke's Club wheats, for experimental growing. Mr. Brooks thought that members should state conditions of soil, cultivation, &c., when reporting results.

STANDARD BUSHEL.—Mr. Wake read a paper upon the fixing of an annual standard average weight of the bushel of wheat, to the following effect:—

At the invitation of the Central Bureau and several Branches, we are invited to discuss this subject. It has been suggested that farmers should send delegates to the Chamber of Commerce in Adelaide annually. If no better plan can be devised, this might be done. A bushel of wheat, clean, good milling quality, weighing 60lbs., should be paid for accordingly; but if it weighs 66lbs. it should be paid for on its extra quality. Such wheat will give more flour than the lighter grain. The present way of testing the weight is far from satisfactory, as no one can arrive twice at the same conclusion. A bushel measure should be provided, carefully filled and streaked, and then weighed. Sixty pounds weight of wheat should be taken as a bushel when selling or buying. The plan of mixing three grades of wheat and making an average sample is unfair to those who thoroughly cleanse their grain.

In a discussion which followed, members were divided in opinion as to whether 60lbs. or 62lbs. should be the standard. [In buying or selling wheat, 60lbs. is always taken as a bushel. In fixing the average weight of a measured

bushel of wheat each season the committee take all the samples sent in from every part of the colony, mix them well, then carefully measure a bushel, and weigh it. This is done over again several times, and the weight of the bushel of mixed samples is taken to be the average weight of a bushel of that season's crop of wheat.—GEN. SEC.]

A PAYING INCOME.—Mr. F. J. Brooks read a paper entitled “The Lowest Amount of Gross Income per Acre a Farmer can Pay his Way on,” to the following effect :—

This must always be a source of controversy, because of the great diversity of conditions under which each farm is worked. The nature of the soil, management, implements, capital, etc., all influence the cost of production, and thus vary the amount of income. Not the least of these factors is management. One farmer may be thrifty, ingenious, careful of stock and implements, keep strict watch over expenditure, put everything to the best advantage, and avail himself of every opportunity of making money—in short, a man who works with head and hands; and another may be a careless, happy-go-lucky sort of man, the reverse of the other. Under such conditions the latter is not likely to make as much profit as the former. Light, friable, level soils can be worked more easily and cheaply than heavy, hilly land. Want of capital, too, will make a man miss many profitable opportunities. This is often illustrated in regard to water conservation. Some farmers are compelled to spend weeks and weeks of most valuable time in carting water, because they have not the capital available to make suitable reservoirs, &c. All these contingencies and variations must affect the question at issue. But he would instance a farm of 1,000 acres, east of the telegraph line, all cleared, sub-divided into four paddocks of 250 acres each, with dwelling-house, stables, sheds, yards, and tanks, the cost of which, with implements, &c., would be :—

	£	s.	d.
Clearing 1,000 acres, 6s.	300	0	0
Fencing, netting, &c.	172	0	0
Sheep-proof sub-division ..	54	0	0
Dwelling-house	200	0	0
Sheds, &c.	100	0	0
Implements	325	0	0
Horses	120	0	0
Harness	20	0	0
Tools, forge, &c.	15	0	0
Tanks, &c.	200	0	0
Cattle	20	0	0
Poultry and pigs	8	0	0
Sheep	20	0	0
Total	£1,554	0	0

This would be a well-appointed farm. For expenses allow—

EXPENDITURE.			INCOME.		
	£	s. d.		£	s. d.
Depreciation of implements, 12½ per cent.	40	0 0	By sheep	30	0 0
Depreciation of fencing, 8 per cent.	18	0 0	“ poultry, pigs, &c.	30	0 0
Depreciation of sheds, tools, &c., 8 per cent.	11	0 0	“ cows	5	0 0
Depreciation of dwelling and tanks, 5 per cent.	20	0 0	“ wheat	367	0 0
Wages	100	0 0			
Living expenses	100	0 0			
Repairs	15	0 0			
Interest on capital, 5 per cent. ..	78	0 0			
Feed for stock	60	0 0			
Total	£432	0 0		£432	0 0

Nothing put down for depreciation in live stock, because increase should be quite equal to depreciation. To make up this amount would require a yield valued at 14s. 7½d. (about) per acre. Probably, in practice, savings could be made on the above estimates, and the by-products would add a good deal to the income of the farm. The land should be divided into four equal paddocks of 250 acres. Two would be annually cropped, one under fallow, and one used for grazing. Having only 250 acres to plough after harvest would enable the work to be easily compassed with the stock kept.

Mr. E. Wake did not think land in this locality would stand cropping more than once during three years for any length of time, and therefore 1,000 acres would not be sufficient. He thought Mr. Brooks' estimates were too high, and that on the mallee country a farmer could pay his way on a less amount per acre. Mr. DuBois thought that on the loose mallee land a farmer could make a good living on 1,000 acres, at 10s. per acre gross income; but not on a smaller area. Mr. Styles thought the estimates too low.

Gawler River, April 24.

Present—Messrs. T. P. Parker (Vice-Chairman), R. Badcock, J. Hillier, A. Bray, D. Humphries, J. S. McLean, A. Hatcher, H. Heaslip, F. Roediger, J. Badman, and H. Roediger (Hon. Sec.).

BULL.—Hon. Secretary reported that a Jersey bull had been loaned to the Branch by the Department of Agriculture, and was stationed at Mr. J. Badman's, Angle Vale.

TASMANIAN FARMS.—Mr. J. S. McLean gave an account of his visit to Tasmania. The soil is generally very good and easily worked. Many farmers grow rape on their fallowed land, and fatten lambs on it. The average rainfall is 25in. Crops are reaped, bound, and thrashed by steam. Average yield about 25bush. per acre. Leading varieties, Madden's Crosses, Smith's Nonpareil, Brown Clubhead, Briggs' Velvet, Carter's Queen, and a few others. Many farmers grow raspberries, strawberries, and hops. Potatoes are largely grown. Dairying is not carried on to any extent, but cattle are reared for market, and sheepfarming is extensive—mostly Merinos and Shropshires. The Lincoln-Merino ewe and Shropshire ram are crossed for marketing lambs. Mr. McLean saw a pen of five lambs, barely fourteen weeks old, turning the scale at 509lbs. live weight, averaging 56½lbs. when dressed, and realising 25s. 6d. per head.

QUESTION.—What fertiliser is required for lucern? [Answer—Lucern being a leguminous plant does not require nitrogen as a rule, but needs phosphoric acid and potash. It is best to give an annual dressing in late autumn or winter—say April or August—with 500lbs. of a fertiliser containing, for each acre, soluble phosphoric acid 9 per cent. and 14 per cent. potash.—GEN. SEC.]

Onetree Hill, April 21.

Present—Messrs. J. Bowman (Chairman), F. Barritt, H. H. Blackham, G. Bowman, W. Kelly, R. A. Kelly, and J. Clucas (Hon. Sec.).

DISTRESSED FARMERS' FUND.—Members propose to assist in case a permanent fund is established for relief of farmers.

EXHIBITS.—Mr. Kelly showed two pumpkins, about 70lbs. each. Mr. Blackham tabled good samples of Acme and Golden Queen tomatoes.

HORSES.—Several horses have died lately in this district. The death of old horses is not regarded as unusual, as, on account of their teeth, they cannot do well on dry feed, and consequently are poorly nourished towards end of autumn. Bearded wheat is not considered as good as other varieties for horse feed, and Medea was specially condemned. As unevenness of teeth interferes with the proper mastication of food, the teeth should be filed down on the uneven parts. Mr. Kelly explained how this should be done. It was surmised that an unusual display of bad temper in a horse might be the result of toothache.

SHELTER SHEDS.—After a lively and instructive discussion upon the subject of shelter sheds for live and dead stock, members were invited to submit plans

for shelter sheds. [This is a subject well worthy the attention of other Branches, and if plans or sketches are submitted they should be sent to Central Bureau for possible illustration in *Journal of Agriculture*.—GEN. SEC.]

MICE.—It has been found that mice cannot penetrate large stacks of sheaved hay near to the ground, and it was suggested that if sheets of corrugated iron were laid round the edge of the stack all round at about a yard high, projecting like a shelf, the mice would be unable to climb above the impenetrable line. It was admitted, however, that this would make the building of a good stack no easy matter, especially if the hay were ripe and dry.

SHEEPSKINS.—A question was asked how to preserve sheepskins. [See *Journal of Agriculture and Industry* for August, 1898, page 42.—GEN. SEC.]

Brinkworth, April 21.

Present—Messrs. A. L. McEwen (Chairman), J. F. Everett, A. W. Morison, H. Bastian, W. Wundke, J. Stott (Hon. Sec.), and four visitors.

STANDARD BUSHEL OF WHEAT.—Members discussed this matter at length. [They apparently misunderstood the subject. Wheat is always sold and bought at 60lbs. for a bushel. But bad seasons produce lighter grain than is produced during good seasons, and a *measured* bushel of grain will weigh much heavier in a good season than after a bad season. The weight of a *measured* bushel of wheat fixes its quality, and quality to some extent fixes its value in the British markets. It would be impossible to fix the weight of an *average* bushel of South Australian wheat for next season until after the wheat is reaped, and samples obtained from all parts, mixed well, measured carefully, weighed, and remeasured and reweighed several times to make the thing a perfectly accurate average. Whatever the standard average weight of the bushel of wheat for the whole colony may be in any one year, the selling weight of a bushel will be 60lbs.—GEN. SEC.]

PAPER.—Mr. C. A. Horne's paper on "How to Beautify the Home, and make Farm Life Attractive" was read and discussed.

RAINFALL FOR APRIL.—Condownie, 0·02in.; Brinkworth, 0·91in.

Strathalbyn, May 8.

Present—Messrs. M. Rankine (Chairman), Hon. J. L. Stirling, B. Smith, D. Gooch, A. Rankine, W. M. Rankine, and J. Cheriton (Hon. Sec.).

IRRIGATION.—Some discussion took place on irrigation and the beneficial effect of same on various crops.

FRUIT CULTIVATION.—Mr. Porter, of Currency Creek, gave an interesting address on "Cultivation of Fruit Trees and Preventive Treatment for Diseases."

Willunga, May 6.

Present—Messrs. W. J. Blacker (Chairman), J. A. Hughes, Thos. Pengilly, T. Atkinson, R. Russell, J. Allen, A. Slade, J. Valentine, W. J. Binney, J. Hocking, and C. Bray (Hon. Sec.).

OFFICERS.—Messrs. W. J. Blacker (Chairman) and Mr. C. Bray (Hon. Secretary) were thanked and re-elected, and Mr. Thos. Pengilly was elected Vice-chairman.

"PIGS, AND HOW TO MAKE THEM PAY."—This was the title of a paper read by Mr. A. Slade, as follows:—

First, it is necessary that pigs should be properly housed. The sty should be built with a good strong wall 3ft. to 4ft. high, with a roof about 7ft. from the ground. Straw thatch is best for a climate like ours. It takes less food to make a pound of flesh when the pig is kept warm and dry. A pigkeeper should either breed or fatten. If he decides on confining his work to fattening he ought to buy young pigs, say, from seven to ten weeks old, and get them ready for the market. I do not think he should keep any sows. It would be more profitable for a dairy farmer to fatten than to breed, because milk is a good fattening food. Pigs for the market should weigh from 60lb. to 80lb. dressed; these always bring the highest prices. I have known 6d. per pound being given for pigs about 70lbs. weight, whilst 200lbs. did not average 4d. In rearing and fattening pigs the following data may be considered:—Take a young pig weighing 20lbs., dressed weight, at 6d. per pound, equal to 10s.; 5lbs. of wheat will add 1lb. pork to its weight, and 400lbs. of wheat will make 80lbs. pork; total 100lbs.; value, say, 4½d. per pound, equal to £1 17s. 6d. Then we have cost of pig, 10s.; cost of 400lbs. of wheat, say, 16s., 8d.; total cost, £1 6d. 8d., giving a profit of 10s. 10d. Now take a grass-fed pig weighing 100lbs. dressed, value £1. It would need 6lbs. wheat to add 1lb. meat to his carcass, and 600lbs. wheat to increase 100lbs. pork. We can reckon this 200lbs. as worth 3d. per pound, equal to £2 10s. The cost of the pig is £1, of wheat £1 5s.; total, £2 5s., thus showing a profit of 5s. only. So it would not appear to be wise to buy big store pigs for fattening. In my opinion the pure Berkshire will pay better to breed and to fatten than the Berkshire and Essex cross. Great care, however, should be taken in selecting the animals. Always, if possible, get them from a person who takes care of his stock.

Kapunda, May 6.

Present—Messrs. H. T. Morris (Chairman), J. J. O'Sullivan, W. Flavel, J. P. Orchard, W. Shannon, G. Harris, Pat. Kerin, J. H. Pascoe, and T. Jeffs (Hon. Sec.).

FARMERS' RELIEF FUND.—It was resolved that this Branch does not approve of a permanent relief fund for distressed farmers.

FORESTRY.—Mr. W. Shannon read a paper on this subject:—

Landholders should go in more largely for planting a few trees of a good sort every year. Homesteads that have no natural timber growing about them, or have not had some evergreen trees planted, look, as a rule, very bleak and bare, and little or no protection is afforded against the cold wintry winds of winter or the very hot winds and fierce sun that often-times prevail in the summer months. I cannot help thinking that, with very little expense indeed, and not a great amount of labor in the slack winter months, this defect could be easily remedied. By planting a few trees every year the home and the surroundings would soon present quite an altered appearance for the better. I feel sure that at the rate our natural forests are being destroyed, within another fifty years timber will be very scarce indeed, and will be a valuable asset on every farm where the landholder has had the foresight to conserve the natural timber or had planted some useful kind of trees, such as the sugar gum. There are patches of land on nearly every farm where the ground is too rough and perhaps too stony for cultivation, and upon such ground as this the sugar gum thrives splendidly. This kind of tree is very useful, is very rapidly grown, and is also a beautiful tree, and adds immensely to the appearance of the homestead. It is, however, only labor thrown away if the stock are allowed to get into the place where the young trees are growing. A farmer who intends to plant trees must go to a little trouble and put a decent fence round the piece of land proposed to be planted. It will also pay handsomely to cultivate the land well by moving the soil to a good depth—the trees grow twice as quickly, and the chances of the young trees living during the first summer are better assured. After the first summer is over the trees require no more attention beyond seeing that stock are kept away. What an improved appearance our farmers' homes would present in a few years if the planting of some trees was to be the recognised duty of every landholder. Trees are the cheapest and most effective breakwinds that we can have. I can, from personal experience, recommend planting a few pepper trees (*Schinus molle*) around the yards and outbuildings; but, of course, not near enough to do damage to the walls, or near an underground tank. These trees grow quickly, are very hardy and nice looking; but they must be well protected even from horses. I find that when stock take to eating the trees, peculiar as the taste may be, they are very fond of pulling off the small branches, and thereby spoiling the look of the trees. The pepper tree sends limbs out close to the ground, and these afford splendid shelter for the poultry; they take away the barren look of the place, and add greatly to the appearance of the farmyard.

TYING FLEECES.—Mr. Orchard drew attention to diagram in *Journal of Agriculture* illustrating the tying of fleeces of wool. He pointed out that the system of tying the fleeces was disapproved of by the merchants and discouraged, as it had been proved to reduce the value of the wool.

Millicent, May 4.

Present—Messrs. R. Campbell (Chairman), S. J. Stuckey, H. F. Holzgrefe, H. A. Stewart, Geo. Mutton, W. H. Rich, W. R. Foster, L. Oberlander, H. Warland, and E. J. Harris (Hon. Sec.).

PUBLIC MEETING.—It was decided that the annual meeting of the Branch on June 21 be made a public meeting. Messrs. Geo. Quinn, Inspector of Fruit, and G. S. Thomson, Dairy Instructor, promised to attend and give addresses on Fruit Growing and Dairying respectively. The ladies' grange would unite with the Branch in arranging for meeting.

EXHIBITS.—The Chairman tabled tuft of grass like a rye-grass, but different from both English and Italian varieties; seeds of Strawberry trefoil, a valuable annual fodder, seeds of which he offered to send to any member of the Bureau forwarding stamp for postage; also seeds of Tree onions and cabbage. Mr. Stewart reported Velvet beans grew about 2ft. high. Members reported complete failure with Cow peas.

DESTRUCTION OF BIRDS.—Members complained of the wanton destruction of insectivorous and vermin-eating birds, such as plovers, laughing jacks, ibis, and others.

APPLES.—Mr. Stuckey was advised to cut down old and useless apple trees, and bud or graft on to some of the shoots they would throw out. Mr. Rich said he had successfully renovated old apple and pear trees by cutting them off just above the old grafts. They soon grew into fine trees. Mr. Mutton reported that his Irish Peach apple had borne two crops this season.

Woolundunga, April 19.

Present—Messrs. H. Aldenhoven (Chairman), J. Grunike, F. A. Sells, J. Greig, J. Partridge, and N. Rogers (Hon. Sec.)

ABNORMAL GROWTH.—Mr. Aldenhoven tabled branch of pear tree with eight small pears on it, and stated that this was the third lot of fruit the tree had produced during the season.

RABBIT-DESTRUCTION.—At previous meeting Mr. Grunike read a paper on this subject, as follows:—

I have had to do with the destruction of rabbits during the past few years on about ten square miles in the hundred of Woolundunga, and spent a lot of money in shooting and digging out rabbits; but always found that the few dozen left on each section were quite enough to stock up the country again. For a couple of years I had a small army of blacks at work on the block, and, although during the last year they were at work I sent away over 40,000 skins of rabbits caught by them, I found next season the rabbits were as numerous as ever. Like many other people, I had all along a decided aversion to dabbling in poison, having the mistaken idea that the process of preparing and applying it was both difficult and dangerous. But at the beginning of this summer, being convinced that all my previous efforts had been wasted, and that my system was wrong, I decided to plunge into the poisoning method, with the result that I have cleared the place of rabbits. I fenced in watering places with netting, and put out dishes with strychnine water, killing several hundreds in a few nights. I dissolved a quarter of a cup of tartaric acid in half a cup of boiling water, and then dissolved a dessertspoonful of strychnine in this liquid. This, with 4lbs. of sugar added to 5galls. of water, will poison hundreds of rabbits. In hot weather they drink this readily when blocked from their ordinary drinking places. To get at those scattered all over the place away from

watering places, I used phosphorised pollard and bran. Take a stick of phosphorus 3in. or 4in. long, break it into three or four pieces, and drop into a pickle bottle. Pour in sufficient bisulphide of carbon to barely cover the phosphorus, and in ten minutes it will be thoroughly dissolved. Have ready a kerosene bucket half full of water in which 4lbs. of sugar have been dissolved. Empty the pickle bottle into this bucket, keep stirring it, and add bran and pollard in about equal quantities until it gets too thick to stir. This will be still too wet to put out. I used a dish in which to knead it up with my hands until the stuff gets rather stiffer and drier than ordinary dough. Place the stuff in rabbit warrens, under bushes, and banks of creeks, where stock cannot get at it. I do all the mixing and distributing with my hands. Pellets the size of small marbles do all right. The only danger in connection with phosphorus is in dissolving it. It must be transferred quickly from the bottle containing the sticks and immediately covered with bisulphide. When once dissolved and mixed with pollard, &c., there seems to be no danger of ignition. Since the rain last month I ploughed furrows and laid pollard in these, having first removed all stock from the paddock, and these furrows attracted the few old rabbits, many of them dying in and near the furrows. I used oil of linseed latterly, as recommended by a member of a Branch Bureau; but I do not think it is required. [Oil of unseed, not linseed, was recommended.—GEN. SEC.] The main thing is to get to work early in the summer, when everything is hot and dry. The rabbits will then take the stuff very readily. If the poison be laid two or three times over the same area there will be no rabbits left. This is what I have done on the land I have treated. I have cleared the rabbits almost completely on about 7,000 acres badly infested. I have used eighteen sticks of phosphorus, two and a half bags of bran and pollard, $\frac{3}{4}$ cwt. of brown sugar, and one large bottle of bisulphide of carbon. This material cost—phosphorus, 10s.; bran and pollard, 15s.; sugar, 13s.; bisulphide, 2s.; total, £2. It has taken a man's time for a month in laying the poison. This, at 25s. a week, amounts to £5; so that, at a total cost to me of £7, I have cleared the rabbits off my place at a cost of less than £1 per square mile. My experience this season satisfied me that rabbits can be easily and cheaply destroyed by means of phosphorus.

FARMERS' RELIEF FUND.—The suggested permanent relief fund did not meet with the approval of the members.

QUESTION BOX.—A number of questions were asked through the question box. No reason could be given for failure of broad beans to bear in this district. The locality was considered too dry for French or Kidney beans. Peas should not be watered when put in the ground. The soil should receive a good soaking before planting. Tomato seeds should be sown in May, and plants set out in August.

Dowlingville, May 15.

Present—Messrs. R. A. Montgomery (Chairman), J. Phelps, J. Burkin, H. Crowell, R. Willing, G. Mason, F. Ilman, R. Foggo, J. L. Broadbent (Hon. Sec.), and two visitors.

DISTRESSED FARMERS' FUND.—After considerable discussion, it was resolved "That, while the Branch sympathises with the farmers in the drier districts, we are not in favor of the proposed permanent fund unless it can be proved that the fund would become of general benefit, and not only as a relief to farmers in the arid districts, where, in the opinion of the members, farming for wheat should never have been tried."

DOGS AND SHEEP.—Some discussion took place on damage to flocks caused by dogs.

STANDARD BUSHEL.—This question was discussed, but no decision arrived at.

Hartley, May 12.

Present—Messrs. C. Harvey (Chairman), J. Stanton, J. B. Sanders, A. Dalton, A. Thiele, A. Jaensch, W. Kutzer, J. Jaensch, and H. Lehmann (Hon. Sec.).

FARM IMPLEMENTS.—A discussion took place on farm implements and labor-saving machinery. Mr. J. Jaensch was of opinion that single-furrow ploughs could be done away with, and three and four furrow ploughs, with seed drill

attached, used. Land rollers should be made in three pieces, to prevent dragging, and allow of turning without injuring the wheat plants. He had an iron roller in three pieces that worked satisfactorily. The binder was the best implement for cutting hay. Mr. Dalton favored a drag, made by bolting planks together lengthwise, in place of the roller; he did not believe in rolling the crop, but would use the drag to prepare the land for the seed. Mr. Sanders used the drag with great satisfaction. It crushes the clods, levels small mounds, and gives the furrows a good curve, preparing the land well for the binder to do good work. He preferred it to the roller, and it was better for the crop than harrowing, as it left the ground very smooth. Other members, however, favored keeping the surface of the soil loose, as the wheat thrived much better. Some members thought in time the stump-jump implements would go out of use, as it would be better to remove the stumps. The bushes growing round the old stumps prevented the growth of a lot of grass.

Belair, May 5.

Present—Messrs. O. Nootnagel (Chairman), W. J. Bartlett, Jno. Halstead, and G. R. Laffer (Hon. Sec.).

FARMERS' RELIEF FUND.—Members did not favor the suggested permanent relief fund, being of opinion that, sooner or later, the farmers would have to abandon some of the drier districts, and that it would be more satisfactory to take some steps to assist them to take up land in better watered districts.

QUEENSLAND FRUIT FLY.—The Hon. Secretary tabled preserved specimens of this insect, and stated that the Victorian Entomologist assured him that the only way to be absolutely sure of keeping out the pest was to prohibit the importation of all fruit from any colony where it existed. It seemed to thrive best in the cooler parts of New South Wales, but he could not say that it would not thrive in South Australia. Fumigation was almost useless for dealing with the larvæ in the fruit.

Maitland, May 6.

Present—Messrs. H. Pitcher (Chairman), H. Bawden, H. R. Wundersitz, C. F. G. Heinrich, C. W. Wood, A. Jarrett, and J. W. Shannon.

OFFICERS.—Messrs. H. R. Wundersitz and C. W. Wood were elected officers for ensuing year.

PHYLLOXERA.—A short discussion on the proposed Phylloxera Prevention Bill took place, but consideration was adjourned until it was known what form the new Bill would take. Most members seemed to be of opinion that the previous Bill was all in favor of the large growers, and was almost a premium to unscrupulous persons to introduce the pest.

DISCUSSIONS.—It was decided to adopt the Chairman's suggestion that each member be asked at next meeting to give his experiences with seeding and harvest during past season, especially in regard to use of manures.

Cherry Gardens, May 9.

Present—Messrs. T. Jacobs, C. Lewis, G. Brumby, J. Mackereth, and C. Ricks (Hon. Sec.).

CO-OPERATION.—The Hon. Secretary read an article from *Advertiser* on Fruit-growing and Co-operation, and a discussion ensued on the benefits of co-operation.

Dawson, May 13.

Present—Messrs. R. Renton (Chairman), Jno Collins, C. W. Dowden, C. C. Kyd, O. Müller, A. H. Warner, A. F. Dempsey (Hon. Sec.), and one visitor.

FARMERS' RELIEF FUND.—Considerable discussion on this subject took place. Those members who had had experience in distributing relief during past two years, and as councillors dealing with seed-wheat distribution, were afraid that it could not be worked. A resolution in favor of the proposed fund was carried, but members could not suggest any workable scheme.

FIELD TRIALS.—It was decided to hold a public field trial of Heithersay's new four-furrow plough, and some of other makers, on Mr. Dowden's farm. A careful test will be made of the draught as well as of the work preformed.

PIGS AND CALVES.—The Chairman called attention to high prices ruling for pork and veal, and a discussion ensued on feeding of pigs and calves. The Chairman said he got better results from handfeeding calves than was possible with calves reared by the cows. Especially was this the case when eggs fetch only 3d. to 4d. per doz., as it paid to mix some with milk or other feed. The general opinion was that if pastures are good no handfeeding could compare with the natural suckling of the cow. Mr. Johnson said he had reared a calf under natural conditions which weighed 280lbs. at twelve weeks old.

Clarendon, May 11.

Present—Messrs. J. Spencer (Chairman), D. Thomson, A. Harper, W. A. Morphett, A. A. Harper, R. Hilton, J. Chapman, J. Juers, W. Spencer, and A. L. Morphett (Hon. Sec.).

MANURES.—Considerable discussion on this subject took place. Mr. Harper had best results from mixture of English super. and bonedust. The crop went 25bush. per acre. He did not consider Thomas phosphate suitable for this district. Where manure was used the land must be well cultivated. It was folly to go to the expense of putting manure on the land otherwise. For peas, he had splendid results from the use of Adelaide Chemical Works super. and bonedust. Mr. Spencer applied 4cwts. Conrad's bonedust per acre to a pea crop, getting a splendid return from the peas, and two good crops of hay in the succeeding years, without any additional manure.

Mount Pleasant, May 12.

Present—Messrs. G. Phillis (Chairman), W. Vigar, J. A. Naismith, W. Lyddon, F. Thomson, P. Miller, jun., J. F. Miller, J. Maxwell, and H. T. Hull (Hon. Sec.).

BROADCASTING AND DILLING.—Mr. P. Miller initiated a discussion on broadcasting *versus* drilling wheat. He would like to see the relative values of the two methods authoritatively determined. Mr. Vigar said they saved about 15lbs. seed per acre by drilling, but the work was much heavier on the horses. There was no question about the effect of putting the manure and seed in with the drill. The Chairman said the extra work on the horses must be taken into account when the question of the value of drilling in the seed was considered. Mr. Miller thought, for the wheat, the manure was better drilled in; but, for the benefit of the land and for the grass, broadcasting was preferable. The price of wheat would determine the matter to a large extent. With wheat so low, the saving of seed through drilling in the seed was not of much account, whereas the grass was, in their district, a very important consideration. Mr. Maxwell considered

the slow and heavy work of the drill a great disadvantage. They could broadcast ten acres while they drilled in one, with the same number of horses. The Chairman thought, on small farms, with manuring and annual cropping, the drill might be better; but not on large farms, where the land was not cultivated every year.

PICKLING SEED WHEAT.—The Chairman said he had proved to his own satisfaction that pickling seed with salt was not a preventive of bunt, whereas with bluestone pickle the crop was quite clean. Half a pound of bluestone per bag was sufficient. Some members complained of the inferior quality of some of the bluestone sold. Sometimes part consisted of greenstone, which was useless for pickling purposes.

POTATOES.—Mr. Thomson reported good returns from Beauty of Hebron potatoes. Sown on January 16, the crop was fit to dig on March 20. Sown again, they were now coming on well. Mr. Vigar agreed. He obtained eighteen bags from 1cwt. of seed, the sample being good.

Colton, May 6.

Present—Messrs. P. P. Kenny (Chairman), W. A. Barnes, B. A. McCaffrey, A. S. Bartlett, E. H. Whitehead, W. C. Packer, and R. Hull (hon. sec.).

HORSE COMPLAINT.—Members wished to know remedy for horse suffering from violent cough and heaving sides. There were a number in the district affected. [It is difficult to suggest treatment for this, as it may arise from a variety of causes, and has probably been aggravated by poorness of feed. It may run its course and disappear. An occasional drench of linseed oil may do good. If stock have dry feed change to soft food.—GEN. SEC.]

DISTRESSED FARMERS' FUND.—Members expressed sympathy with those in the drought-distressed districts, but could not approve of the proposed permanent fund, as they thought it likely to undermine the independence of those who would receive assistance from it.

Meningie, May 13.

Present—Messrs. Jabez Williams (in chair), W. Tiller, D. Roberts, T. W. R. Hiscock, C. J. Shipway, R. M. Scott, W. J. Botten, H. May, A. J. Myren, and H. B. Hacket (Hon Sec.).

DISTRESSED FARMERS' FUND.—Considerable discussion on this subject took place. While members sympathised with the farmers who have suffered so severely during the drought, they were of opinion that it would be better to help those who are on land not suitable for farming operations to remove to other districts than to attempt to keep them where they are.

STOPPING SAND DRIFTS.—A long discussion took place on paper read by the Hon. Secretary, at March meeting, on this subject. Mr. Shipway generally agreed with the Hon. Secretary, and especially in regard to planting trees on the windward side of land likely to be affected by drift. He thought steps should be taken to compel owners of land to take precautions to prevent the land drifting, or to reclaim drifts already existing; but it would be of no use leaving it to the district councils to do the work, as the members were often the greatest offenders in allowing the sand to drift. Mr. Botten agreed as to necessity for action, and thought the Government should insert in all leases of land likely to be affected, a proviso requiring the lessee to protect the land from drifting. Other members agreed that special legislation would be necessary to prevent trouble, and a resolution was carried favoring legislation to

provide that—(1), owners of land allowing sand to drift on to public roads from their lands be liable for damage; (2), owners or lessees to be liable for damage caused by sand drifting on to neighbors' land; (3), district councils to be liable for damages caused by sand drifting from the roads on to private property, or leasehold; (4), a Government inspector to be appointed with power to order necessary action to comply with the Act.

FIRES.—Mr. Scott initiated a discussion on dealing with bush fires and fires in grain heaps. It often happened that on a fire occurring people rushed to it quite unprepared to combat it, and consequently simply had to look on. In sandy or light soil a shovel or spade was more effectual than any beater. A good shovel of soil properly thrown along the borders of a fire will extinguish yards at a time. It is best to work from the back of the fire, so as to run it into as narrow a space as possible. Water should be provided for the workers, as they soon become thirsty. When wheat or barley heaps get on fire the best and quickest way to put them out is to cover them with earth and smother the fire. Mr. Roberts considered water better than earth for putting out fire in grain heaps, as often the soil was such that it could not be quickly thrown over the heap, and in any case water was more effectual. Other members agreed that the method suggested by Mr. Scott for dealing with fires in the country described was the best.

BOILED GRAIN FOR STOCK.—The Hon. Secretary said he had heard that feeding boiled wheat or barley caused horses to break out in lumps or pimples. He thought this incorrect, and would like the opinions of members. He could understand raw corn causing this, owing to its heating the blood. Members agreed that boiled grain would not have this effect on the horses. They considered the best plan to treat the grain was to pour boiling water on it, and allow it to stand over night.

ANALYSIS OF SOILS.—Mr. Tiller brought forward the question of the analysis of soils. He understood members of Branches could get soil analysed through the Central Bureau free of charge. [This is not correct. The department does not undertake free analyses of soils or manures. The charge is 3s. for each determination required.—GEN. SEC.]

Morphett Vale, May 10.

Present—Messrs. J. Bain (in chair), H. Anderson, J. Depledge, J. Spriggs, H. Liston, T. Anderson, and A. Ross Reid (Hon. Sec.).

MANURES.—Mr. Liston read a paper on this subject, and produced several samples which he had tested. He had found some of them below their guaranteed standard. He had found that top-dressing with 1cwt. Sugar Refinery super. was equally as good as drilling with English super.

Boothby, April 25.

Present—Messrs. J. T. Whyte (Chairman), E. Bradley, W. Mills, H. G. Evans, H. S. Robinson, T. B. Robinson, T. Sims, J. Bell, R. Chaplin, and G. T. Way.

FARMERS' RELIEF FUND.—Members decided to help on this fund as much as possible.

WHEAT EXPERIMENTS.—Mr. Mills reported that White Monarch wheat was worthy of further trial. It stools well, grows fairly high with strong straw, not likely to go down, and is nearly as early as Steinwedel.

WORKING FARM STOCK.—Mr. Sims initiated a discussion on working horse teams. He favored short hours in preference to long hours. Several members

agreed that eight hours was long enough to work the teams. Two members thought, however, that if the horses were well fed, they could do twelve hours' work. The majority of the members considered eight hours' work sufficient for the horses. Mr. Robinson initiated a discussion on dry *versus* damp feed for horses. Members were of opinion that for this district, where wheat-chaff is used so much, damp feed is best for farm teams. Mr. Robinson advocated dry feeding.

Swan Reach, April 22.

Present.—Messrs. P. A. Hasse (Chairman), J. O. J. Kohnke, J. L. Baker, L. Fidge, J. R. Harris, F. F. Brecht, F. Fischer, and P. A. Beck (Hon. Sec.).

ANNUAL REPORT.—The Hon. Secretary's annual report showed that twelve meetings had been held during the year, with an average attendance of 7.5 members. Owing to the dry season experiments with seeds received from the Bureau had not been successful. Mr. J. O. J. Kohnke was elected Chairman, and Mr. P. A. Beck re-elected Hon. Secretary for ensuing year.

Clare, May 12.

Present.—Messrs. J. Christison (Chairman), G. Lloyd, W. Kelly, R. Graham, W. S. Birks, H. J. Yelland, and J. T. Hague (Hon. Sec.).

MANURING.—A discussion took place on drilling and manuring wheat crops. The use of the drill and fertilisers has caused a revolution in farming in this district, and a large area that had gone out of cultivation is being cropped this year. The benefit from the use of fertilisers has been most marked on poor sandy soils, with clay subsoil. One member had got good results from English super. on such land, but on limestone soil it gave no result noticeable. Members thought bone super. might give better results on such land. Mr. Yelland stated that at the Agricultural School they were carrying out a number of experiments on quarter-acre plots with different kinds and quantities of manure.

Mount Compass, May 13.

Present.—Messrs. M. Jacobs (Chairman), T. Chaplin, R. Cameron, C. S. Hancock, A. J. Hancock, E. Good, J. Jenkin, S. Lawrence, R. Peters, F. Slater, W. Wright, H. McKinlay (Hon. Sec.), and four visitors.

EXHIBITS.—Splendid specimens of Rome Beauty and Cleopatra apples grown by Mr. C. S. Hancock on trees three and four years old respectively. Bruce potatoes from Central Bureau seed, good yield but small tubers.

OFFICERS.—Chairman and Hon. Sec. thanked and re-elected; Mr. R. Peters, Vice-Chairman; Mr. A. J. Hancock, crop and weather reporter.

HOPS.—Mr. M. Jacobs reported on a visit paid by himself to Mr. David Murray's hop garden, Rockford, near Echunga, as follows:—

He had held the opinion that hops could be profitably grown on the drained lands at Mount Compass, and with that view he had visited Mr. Murray's garden, near Mylor, and Mr. Murray kindly gave him all the information in his power. The garden is situated in a gully, with a fine stream of water running through it. In the bed of this gully the soil is a rich sandy loam, but becomes poorer as the rise of the hill is approached. At one time there were six acres under hops, but it was found that the higher slopes were too poor, and the better soil was required for other purposes, so the area for hops has been reduced to about one acre, which last year gave a poor crop, owing to hailstones. Mr. Murray said hops will pay well to grow at present prices. The garden used to average 8 cwt. per acre, and they had often picked three bales from less than half an acre; and he considered hops would pay splendidly at

Mount Compass, where, from his own knowledge of the place, he would expect to grow twice the quantity that he could get at his own locality. But windbreaks must be provided. The cost of cultivation of hops, all told, is about £30 per acre. He pays 3d. per bushel for picking, and only grows the grape-hop, but would recommend the cultivation of an early, a medium, and a late variety. Mr. Wright, the gardener, thought wires would give too much trouble, and would continue to use poles for the vines to climb upon. The oat or drying-house would be the greatest drawback at Mount Compass; but Mr. Jacobs was convinced that hops would pay better than anything they were at present growing. Eight hundredweight of hops at 1s. 6d. per lb. would realise £60; cost of production, £30; profit, £30 per acre.

Naracoorte, May 13.

Present—Messrs. O. Hunt (Chairman), S. Schinckel, A. Johnstone, B. S. Roach, H. Smith, F. E. Bates, J. Wynes, Geo. Greenham, G. Wraddle, and D. McInnes (Hon. Sec.).

MEMBERSHIP.—The Chairman reported death of their late Honorary Secretary, Mr. R. U. Paris, and it was decided to send a letter of condolence to his widow.

EXHIBITS.—The Chairman tabled plants of Florida Velvet Bean and Cow Peas, and seeds of *Paspalum dilatatum*, a grass of a hardy nature and very valuable. Business in connection with the recent Conference was also transacted.

Mylor, May 13.

Present—Messrs. W. Nicolls (Chairman), W. H. Hughes, F. G. Wilson, P. Probert, T. Mundy, F. Rosser, E. Wilson, E. J. Oinn, S. W. Jackman, W. G. Clough (Hon. Sec.), and eleven visitors.

MANURES.—Several members reported unfavorable results from Trotman's nitrogen manure, which they attributed to excessive rainfall.

OFFICERS.—Messrs. W. Nicholls, F. G. Wilson, and W. G. Clough were elected Chairman, Vice-Chairman, and Hon. Sec. respectively for ensuing year.

DAIRYING.—Arrangements for formation of Mylor cow club No. 1 were completed. The Hon. Secretary reported arrival of Jersey bull Prince's Lad loaned by the Department of Agriculture.

Mount Gambier, May 15.

Present—Messrs. J. Watson (in chair), G. G. Collins, D. Norman, sen., T. Edwards, J. Dyke, J. C. Ruwoldt, W. Barrows, M. C. Wilson, Stock Inspector Williams, J. Umpherston, W. Mitchell, and E. Lewis (Hon. Sec.).

NARACOORTE CONFERENCE.—Delegates reported on proceedings of conference, and a vote of thanks was accorded to the Naracoorte Branch for their hospitality to the visitors.

DAIRYING.—Some discussion arose on notice of removal from district of bull loaned to the Branch by the Department of Agriculture.

CRIMSON CLOVER.—The Chairman drew attention to the spread of Italian crimson clover in the district. It was likely to prove a valuable fodder plant, especially on light sandy soil. Being an annual it should be fed off in early spring, and stock then removed to allow it to mature its seed. It could be profitably mown for hay. Messrs. Barrows and Dyke also reported favorably of this clover, the latter having sown down a considerable area with it. Mr. R. Smith has had it growing on his land for three years, though cut for seed and hay it has always had sufficient growth again to re-seed the land.

Cradock, May 20.

Present—Messrs. R. Ruddock (Chairman), P. Gillick, J. Peterson, Jas. Clarke, J. H. Lindo (Hon. Sec.), and three visitors.

SEED EXPERIMENTS.—Mr. Jas. Clarke reported favorably of Red Kaffir corn, and recommended further trial. White Kaffir corn and various melons failed to mature. Tomatoes, Ironclad watermelon, Pine-apple, Sweetmelon, and Cocksfoot and Prairie grass, were fairly successful. Other members reported failure with seeds, which they attributed to the bad seasons.

FEEDING WORKING HORSES.—The Hon. Secretary read a paper on "Feeding Working Horses on Northern Farms" to the following effect:—

The best feed for farm horses is good wheaten hay. Hay is the most economical, because the time employed in cutting, carting, and stacking, is not required for any other farm work, for it is then too late for fallowing, and too early for reaping. There need be no waste whatever in feeding with long hay, for there are many ways of making cheap and serviceable mangers, which should be large enough to hold sufficient hay to serve the horses all night. It is but small trouble to fill a manger with hay from a stack, and it takes very little time. Loose hay is preferable to hay cut with binders, as horses fed with binder hay will eat off the heads and then "root" about and waste some of the straw. Hay is the healthiest food that can be given to horses. Working horses fed entirely on hay will last longer and do more work than if fed on corn of any description and chaff, the reason being that good wheaten hay contains all the ingredients necessary to supply the horse with constitutional strength. Some of the principal ingredients are starch, sugar, salt, lime, iron, acid, soda, oil, and water. These, with other ingredients, are concentrated in the wheat plant, which supplies a proper proportion necessary to support the horse, and keep him in good healthful condition. Wheaten hay should always be cut when the grain is just formed, that is, as soon as the blossom has fallen off, for then those ingredients that go to make flour, pollard, and bran, are all disseminated through the whole plant above its roots. But often in the North the wheat crops are too light to cut for hay; then the farmer has to resort to cockey chaff, and whatever he can get to put with it to make a nutritious feed, such as wheat, pollard, bran, oats, barley, maize, treacle, etc. In my opinion the best feed under such circumstances is steeped wheat and cockey chaff. It is cheapest in the long run, and very little trouble. You require two tubs or barrels, each one to hold water and enough wheat to serve your horses one day. Fill one tub the day before you require to feed the horses with, say, 2qts. dry wheat for each horse, and fill the other tub the day you start feeding them. As you empty your first tub the first day of feeding the horses, fill it again at night, then use the second tub next day, and fill it at night, and so on. Steeped wheat is at its best when it has been steeping thirty hours, and should always steep for twenty-four hours before it is used. If it is allowed to steep for forty-eight hours it is just as good as if it only steeped twenty-four hours, and horses that are used to steeped wheat will eat it readily if it has steeped for three days. It will be sour when it has steeped forty-eight hours, but that is just when they like it best if they are used to it, and, it then being in a state of fermentation, is easily digested. To steep wheat properly it should be kept just covered with water the first twelve hours; after that no water should be added, but a good plan is to stir the bottom up two or three times a day. If it is kept covered with water the whole forty-eight hours, it will not burst the germ so readily as if only saturated with water. When roots are struck in long it is still good. The stronger the smell—providing it is not rotten—the better horses will eat it when they are used to it. In feeding with steeped wheat I always scoop it up from the bottom of the tub, and thus take up the wettest with the driest, the water being good for damping the chaff. Horses are very fond of chaff damped with the water off steeped wheat, although it smells very sour. I feel sure that if farmers once adopted a system of feeding horses on steeped wheat, such as I have here described, they would never again give such high prices for bran and pollard.

The Chairman thought wheat would become too sour if steeped for so long as three days. Mr. Clark considered steeped wheat superior to boiled wheat. Mr. Haggerty thought hay grown in the North superior to that grown in the South. Mr. Patterson considered long wheaten hay the best feed. Mr. Gillick said four horses fed on bran and chaffed hay would do as much work as five fed on long hay.

HORSES EATING WHEAT.—Mr. Paterson said that some years back he was asked to prescribe for several horses which had got into the barn one night and eaten nearly a bag of wheat. Drenches of oil and other medicines had been tried without effect, two animals having died. He gave them a mixture of laudanum, nitre, turps, kerosine, rum, linseed oil, beer, and hot water, which

proved very effectual. [Such a mixture is not necessary. The Chief Inspector of Stock states that about 6 drams aloes and half a dram of powdered gentian dissolved in hot water, or one pint of raw linseed oil and $\frac{1}{2}$ oz each of ginger and gentian should have equally as good effect. If the animals are in pain a little laudanum, say $\frac{1}{2}$ oz., should be given. Tonics should be given when the wheat has been voided, not with the oil.—GEN. SEC.]

WILD TOBACCO.—Mr. Clarke asked if the common wild tobacco is poisonous to stock. [The true indigenous tobacco (*Nicotiana suaveolens*), bearing a greenish-white flower, and growing about 2ft. to 4ft. high, is very poisonous, and has caused the death of many cattle and pigs in dry localities during drougthy periods. The tree tobacco (*Nicotiana glauca*), bearing yellow flowers, and growing up to 15ft. sometimes, is an introduced plant, and is also somewhat poisonous. Neither plant is eaten by live stock when food is obtainable.—GEN. SEC.]

Crystal Brook, May 20.

Present—Messrs. J. C. Symons (Chairman), W. J. Venning, J. Chambers, E. Dabinet, M. Weston, and Geo. Miell (Hon. Sec.).

EXPERIMENTAL PLOT.—Mr. Dabinet stated that at next meeting he intended to move that an experimental plot be established in connection with the Branch, and that rainfall and temperature records be kept. Discussions on various topics of local interest took place.

FLORIDA VELVET BEAN.—The Hon. Secretary reported that his plants grew well without watering, and stood the dry weather well; but failed to set seed.

Port Broughton, May 22.

Present—Messrs. R. W. Bawden (Chairman), H. Whittle, E. Dennis, S. M. Bawden, G. E. Pattingale, J. Bates, R. Storr, J. Harford, and J. Barclay (Hon. Sec.).

COVERING HAYSTACKS.—Mr. Dennis stated that he had seen it recommended in the *Journal of Agriculture* to cover stacks with oiled calico to keep out the rain. He did not approve of this, there was great risk of it igniting. He had known a case of fire caused by using oiled calico. Insurance companies consider it an extra risk.

Brinkworth, May 19.

Present—Messrs. R. Cooper (Chairman), A. L. McEwin, A. W. Morrison, S. Aunger, C. A. Horne, W. H. Pearce, J. F. Everett, J. Stott (Hon. Sec.), and five visitors.

OFFICERS.—Mr. G. Freebairn elected Chairman; Mr. R. Cooper Vice-Chairman; J. Stott re-elected Hon. Secretary. Votes of thanks accorded to officers for past year.

ANNUAL REPORT.—The Hon. Secretary read his report of work by Branch during the past year. Fourteen meetings had been holden. Several practical papers were read and discussed. Experiments with seeds of plants presumed to be suitable for economic cultivation in the locality had mostly failed through drought, but Messrs. Othens, Wundke, and Morrison had each tabled products from seeds supplied from Central Bureau. Several recipients of wheat and other seeds had not yet reported. Attendance of members had been fairly

good, but should have been more regular. The *Journal of Agriculture and Industry* is very greatly appreciated, and contains a deal of valuable and practical information contributed by the best authorities.

BUTTER FROM A CONSUMER'S POINT OF VIEW.—The Hon. Secretary read a paper to the following effect:—

He wished to learn why makers of bad butter ask as much for it as is required for good butter. He had purchased some at the local stores which was hardly good enough for cart grease—rancid, mixed with potted butter, and containing white lumps. There were makers in the district whose butter was perfect all the year round—always sweet and long keeping. Some producers bringing butter to the stores almost compel the storekeeper to take it—though the stuff will prove a dead loss—else he will lose their custom for his own goods. Coloring is not necessary to make butter good—there is plenty of excellent butter that is nearly white. What is wanted is butter pure and simple, with nothing added but sufficient salt to give it a relish. This cannot be supplied from a dairy where such things as onions, potatoes, cabbages, bacon, and other malodorous substances are stored.

RAINFALL.—Condowie—For April, 1·40in.; for year, 4·32in. Brinkworth—April, 1·62in.; for year, 4·65in.

Swan Reach, May 20.

Present—Messrs. J. O. J. Kohnke (Chairman), J. L. Baker, P. L. Hasse, R. Barrow, E. Micke, J. R. Harris, L. Fidge, A. G. Zadow, F. Fischer, G. Grieger, P. A. Beck (Hon. Sec.) and four visitors.

BRANCH SHOW.—It was decided that the next produce show in connection with the River Murray Branches be held at Swan Reach on September 21, and that all the Branches on the River be asked to assist in making the show a success.

Pyap, May 18.

Present—Messrs. J. Holt (Chairman), W. Axon, C. Billett, A. J. Brocklehurst, J. Bowes, H. Mills, J. Harrington, B. T. H. Cox, E. Robinson, C. E. Coulls, G. Napier, W. C. Rodgers (Hon. Sec.), and one visitor.

POTATOES.—The following subjects were suggested for consideration at Congress:—(a) Best way to keep seed potatoes for several months; (b) best way to keep a quantity of onions in store. Experiments in keeping potatoes from May to August have been tried. Packed in dry sand they kept fairly well. Packed in dry ashes, in dry straw, and covered with galvanized iron, and in a dark room with plenty of ventilation, they kept well in each case, being quite sound, all shooting and ready for planting in August. In each case the potatoes were rinsed in cold water, some being treated with Paris green and other with sulphur, to prevent damage by insects, both treatments being effectual. The potatoes which kept best were simply stored in bags without any special treatment. Mr. Brocklehurst reported failure with very small potato sets; he preferred whole sets if they are small. The Hon. Secretary advocated full-sized and properly matured seed of all kinds and called attention to favorable results reported from use of large sets of potatoes.

LAGOON FENCES.—In reply to question as to best sort of fence to erect across a lagoon, Mr. Brocklehurst recommended galvanized iron posts and wire, but this was objected to by others, as experience had proved that the galvanized materials did not stand in this locality in water. Gum and pine posts were recommended where they would always be in water, but these would not stand if subject to wet and dryness alternating.

EXHIBITS.—Mr. Robinson tabled sweet potatoes 25lbs. in weight grown from one small set. This was grown on soil on which a crop of beans had been dug in. Mr. Holt tabled trombone weighing 66lbs., and distributed seed of

same. Mr. Axon showed Florida Velvet bean grown in sheltered position; it was a fair sample, but rather late. The Hon. Secretary showed cluster of pods of this bean grown by Mr. McIntosh, Village Settlements Expert, at Overland Corner, where it had made 15ft. of growth over a post and rail fence. Mr. Brocklehurst showed fine samples of Lisbon lemons grown on the settlement.

Nantawarra, May 22.

Present—Messrs. E. J. Herbert (in chair), R. Upphill, Jas. Nicholls, T. Dixon (Hon. Sec.), and one visitor.

MANURING.—A short discussion took place on the possible value of the mud from the lake as a fertiliser, and whether the farmers were justified in removing the mud from the lake.

Watervale, May 22.

Present—Messrs. C. A. Sobels (Chairman), H. Beck, S. Solly, L. Buring G. Hunter, J. Thomas, W. Smith, and E. Treloar (Hon. Sec.).

BROADLEAF MUSTARD.—Mr. Hunter tabled fine specimens of broadleaf mustard from seed sown in March. Members were of opinion that this would be a splendid plant for green manure.

WEEDS.—Members referred to the rapid increase in this district of several different weeds. They were of opinion that it was useless attempting to eradicate stinkwort.

PRUNING FRUIT TREES.—A discussion on this subject took place. Most members considered that after the tree was well rooted and shaped it required very little pruning, except in the case of apricots.

Onetree Hill, May 19.

Present—Messrs. J. Bowman (Chairman), A. Adams, F. Barritt, G. Bowman, J. Flower, J. Hogarth, F. L. Ifould, A. Thomas, P. Taylor, and J. Lucas (Hon. Sec.).

MICE, RATS, AND WEEVILS.—Mr. Flower found when stacking wheat in bags that by placing the bags on end with the ears downward they will not be cut so badly as when laid horizontally, and that interstices are left which allow cats to enter. [If "cocky chaff" were filled between the interstices would it prevent the mice getting into the stack of bagged grain?—GEN. SEC.] Mr. Barritt's plan of building a shelf of corrugated iron in stacks of sheaved wheat was generally approved. It was stated that chloride of lime will keep rats at a distance, and probably mice also. [Sprinkling chloride of lime about the entrance to the nests or homes of rats will affect their feet, and the animals will remove to more pleasant quarters, but it is questionable whether it would have the same effect when used around stacks, unless large quantities were spread frequently.—GEN. SEC.] Weevils in grain can be destroyed by placing the grain in cellars or bins and using bisulphide of carbon.

FOWLS.—Mr. Flower said there had been an unusual fatality amongst his fowls. They became listless at first, then the comb and lobes blackened, they drooped and lost the use of their limbs and refused to feed. If food were forced down their gullet they would recover. He treated them for diarrhoea and they got well again.

SHELTER SHEDS FOR CATTLE.—Mr. Barritt said that for general utility it would be essential that the structure be inexpensive, built of rough material, ready to hand. He recommended a shed upon posts, with a straw stack built on one side and at one end, with a partition from the ridge to within about a yard from the floor, and made of battens or strong wire netting. In front of the opening at bottom a line of slabs might be erected to form a manger. The compartment next the stack side might be filled with "cocky chaff," which would flow almost automatically into the manger in the shelter compartment. The open end of the rear compartment could be fitted with folding doors. The straw stack is a stand-by which no farmer can afford to despise.

CLIPPING HORSES.—Several members decided to try the experiment, which has been recommended for heavy as well as light horses. It has been stated that, when clipped, horses thrive better, are less liable to ailments, and are capable of doing more work. Hairy coats retain moisture, and make the animal susceptible to chills, and, unless carefully and regularly groomed, accumulate dirt, which is always inimical to healthy condition.

STINKWORT.—Members consider that this weed (*Inula graveolens*) is injurious to sheep, especially ewes in lamb, and when in flower is most likely to cause death.

HORSES.—Mr. Hogarth stated he had never known bleeding to fail in effecting a cure for stoppage of water in horses.

Forest Range, May 18.

Present—Messrs. J. Vickers (Chairman), C. Stafford, W. Cherryman, H. H. Waters, R. E. Townsend, J. Sharpe, R. Hackett, and six visitors.

NURSERY WORK.—This meeting was held at Mr. Townsend's Roseville nursery. Prior to the meeting members inspected the nursery, where a fine assortment of young stock was noticed. Some peach stock was exceptionally strong, too rank in fact, in the opinion of the members. Mr. Townsend said this was due to breaking them back when they were budded, causing all the strength of the tree to go into the bud. The Chairman found peaches very liable to gumming if broken back after budding; they were best left alone.

Discussion ensued on different methods of budding and pruning. Mr. Townsend read a paper on "Nursery Work":—

I find, unless the soil is thoroughly prepared and in good heart, with a liberal supply of water to keep the young trees growing through the summer months, that it is useless to attempt nursery work. Hoeing every few weeks to keep the ground loose is a great help to the young trees, as the water makes the ground form into a hard crust, which can only be overcome by continued hoeing. I mostly commence my nursery work in May, beginning with the dog roses, which generally keep me employed till the beginning of July. Then I graft peaches, then apricots, pears, cherries, plums, and apples in succession. Apples I find can be grafted as late as September with good results; generally finishing with top-graft apples on blight-proof stocks. I graft peaches, pears, and apricots on their own seedlings; cherries on cherry suckers, Mahaleb and Black Mazard; apples on blight-proof stocks (either Northern Spy or Majetin), and plums on American plum stocks. I prefer budding, especially with peaches, apricots and cherries, the wood of which is too pithy for successful grafting; on all kinds I find the percentage better from buds. There are different styles of grafting, the double tongue graft being preferred. I tie my underground grafts with string from sugar or bonedust bags, the gunny bags being very coarse. All top grafts are waxed with a composition of my own make, which answers better than tying, as it does not cut the graft when the tree grows, but loosens accordingly. Mulberries I layer from a large tree. It is much better to layer them, as then they are on their own roots. They are generally grafted on the white mulberry stocks, but they gradually overgrow the stock, with the result that the tree dies. Black and red currants, gooseberries, American plums, and vines grow from cuttings, and in favorable seasons are easily grown. I generally have my cuttings about 1 ft. long, and insert them in the ground about 6 in. Sweetwater, Frontignan, and Muscatel grapes grow and bear well here. Roses I bud on dog rose stocks, and have fair success. A 24 in. standard is about the best, as the top overbalances the standard when too high.

In the discussion which followed Mr. Townsend said he watered his stocks well about two weeks before budding, and removed the strings about a fortnight after. He preferred high standards for fruit trees, as the land could be more easily cultivated. Mr. Waters stated that in reforming old trees he cut them back, and about Christmas budded on the young growths. He asked whether it was advisable to leave the bottom buds on gooseberry cuttings. Mr. Townsend left them on till transplanting, when he rubbed them off. Mr. Sharpe disbudded when planting; he preferred cuttings 15in. long. The Chairman liked to have 9in. or 10in. of barrel. A vote of thanks was accorded to Mr. Townsend for his paper and for showing the visitors round, and to Mrs. Townsend for providing refreshments.

Finniss, May 1.

Present—Messrs. T. Collett (Chairman), W. W. Heath, H. Langreher, and S. Collett (Hon. Sec.).

BUSINESS.—Mr. Willcock forwarded his resignation, as he was leaving the district. Discussion ensued on non-attendance of members.

Lucindale, May 6.

Present—Messrs. E. Feuerheerd (Chairman), G. C. Newman, W. Lobban, S. Tavender, L. McInnes, W. Dow, A. Dow, A. Matheson, J. Bourne, and E. E. Dutton (Hon. Sec.).

ANNUAL REPORT.—The Chairman reported that during the year the attendance had on the whole been satisfactory. A number of important subjects had been discussed with benefit to the members. The annual conference of South-Eastern Branches held at Naracoorte was well attended by delegates from the Branch, and was a great success. He hoped next year's conference, to be held at Lucindale, would be equally successful. Messrs. E. Feuerheerd and E. E. Dutton were re-elected Chairman and Hon. Sec., respectively.

EXPERIMENTS.—The Chairman reported that at his experimental plots, at Rocky Gate, he obtained equal to 5 tons 6cwts. of potatoes per acre, and 5 tons of onions per acre. Results from melons were also good. Mr. Tavender reported damage to cabbages by grubs.

Auburn, May 25.

Present—Messrs. W. R. Klau (Chairman), E. M. Dudley, S. Ford, G. R. Lambert, W. F. Keynes, J. T. Kirkbright, and Dr. J. W. Yeatman (Hon. Sec.).

PHYLLXERA BILL.—Some discussion on this subject took place. It was decided to ask the delegate to the Conference of Vignerons, held in Adelaide, to attend a public meeting of those interested, and report on proceedings of the conference.

Kanmantoo, May 25.

Present—Messrs. J. Downing (Chairman), W. G. Mills, J. Mullins, J. T. Hair, F. Lehmann, T. Lewis, and A. D. Hair (Hon. Sec.).

TUBERCULOSIS.—Members were of opinion that this disease is on the increase, and should be seriously watched, because the lives of human beings

is much endangered through its presence. Careful selection of the breeding herd, perfectly healthy sires, elimination of all animals showing signs of weakness or delicate constitution, is needful.

BEST WHEATS FOR DISTRICT.—Mr. Lehmann was in favor of Early Para, Purple Straw, and White Tuscan. The latter is most suitable for hay, and even rabbits prefer it to any other sown alongside. Members thought bearded wheats should not be used for hay, as the beards collect within the mouths of horses and cause much pain. Mr. Mullins said Steinwedel is a good yielder of grain, but wasty for hay. Mr. Hair said stock will prefer Steinwedel hay when they have liberty to attack several varieties.

PICKLING SEED WHEAT.—Mr. Mills said he had used bluestone and lime (mixed) last year as a pickle for wheat. The crop turned out rather bunted. Wheat pickled with bluestone alone was practically free from bunt in the resulting crop. Mr. Downing said he put a little lime into boiling water, kept stirring until bubbles ceased to rise, then mixed it well with the seed wheat till every grain was soaked. There was very little bunt in the resulting crop.

HAY.—Mr. Lewis' horses like Cape oat hay better than Algerian oat hay. It is sweeter, has less husk, and has more corn. Mr. Hair said his horses do well on Algerian oat hay. It is best, because it gives a much heavier crop of hay and grain than any other he had tried. The crop should not be cut until very nearly ripe, when the bitterness is dissipated. This is the practice of many Victorian farmers, who grow it largely on account of its productive qualities. The hay should always be chaffed, as it grows a much stouter straw than Cape oats.

Quorn, May 25.

Present—Messrs. R. Thompson (Chairman), F. Herde, C. Patten, James Cook, H. Cowan, H. Porter, W. Toll, H. S. Stacey, and A. F. Noll (Hon. Sec.).

PROFITS OF PIGS.—Mr. R. Thompson read a paper, of which the following is the substance :—

Wheat is at a low price, and pork at a high price. Dairy-fed pork is of such good quality and so much appreciated that some butchers and dealers have often been tempted to make false statements with regard to the origin of the meat they have on sale. The prejudice against pork that has been raised upon slops and butcher's offal is not unreasonable, because the meat is affected by the food upon which the animal has been fed. It is very rarely, indeed, that dairy pigs are reared upon milk alone. They get the waste, buttermilk, whey, skim milk (when not required for calves), but the main portion of their sustenance consists of a little grain, waste from the garden and kitchen, and a final topping-up with boiled wheat, scalded pollard, or perhaps boiled peas or barley meal, in addition to the waste aforesaid. The fact that farmers have continued for centuries to breed pigs ought to settle the question as to whether it pays to do so. Of course, profit depends upon the markets and the cost of keep. The latter may be limited by economical management, or increased by extravagance. There are some pigs that will mature much more quickly than others. If pigs are kept in sties and fed upon grain from birth until maturity, the pork will cost a great deal more than that of pigs which are allowed a good deal of liberty during the first part of their lives. Still, there are few farms where pigs can be allowed to roam, lest they should get across the owner's boundary and get destroyed for trespass. But there are not many farmers who cannot grow a supply of green stuff during spring, and mangolds, beets, pie melons, kohlrabi, swedes, sorghum, etc., during summer and autumn, to keep a number of pigs in fair condition. It is quite a mistake to feed pigs largely on grain and meal at first. This should only be commenced when they have grown nearly large enough for killing. In America pigs are chiefly fed upon lucern and similar green feed until within a few weeks of killing, and then they have solid food to make the meat firm and sweet. The pig seems to thrive equally well upon flesh, grain, or grass, but the flavor and quality of the meat is affected by the food, and therefore it must be made firm, sweet, and nutty by the use of grain and similar hard food. All pigs should have a shelter, and the floors of the sties should be of cement, concrete, or slabs well jointed, with a fall to one corner, and a cusk or tank to catch all liquid, which should be regularly carried on to the garden. A fair area of land should be enclosed with pig netting, so that the pigs

can have a run, and be able to root about. The sties should be flushed with water twice or thrice a week to keep them sweet. No animal can thrive if subjected to extremes of cold and heat, either of which will cause a waste of the body, otherwise waste of food, adding to the cost of producing the pork.

Mr. Herde never allows his pigs to run at large, because they make the farm dirty with weeds. Pigs should be fed three times daily with slops and waste while they are growing, and a few weeks before killing as much crushed and steamed wheat as they will eat should be given. He had lately killed a pig, seven months old, weighing 160lbs. He favored the Berkshire hog with good roomy sows of any breed. Mr. James Cook had had considerable experience with pigs, and felt certain they were very profitable. He grew mixed rye and barley to feed green to the pigs, and when ripe he cut and stacked it, and fed straw and grain to them. It kept the pigs employed in rooting out the grain, and they ate nearly all the straw too. He also fed peas in the haulms to them. The Berkshires produce more lean meat than any other breed.

Johnsburg, May 1.

Present—Messrs. F. W. Hombsch (Chairman), T. Potter, J. R. Masters, T. A. Thomas, G. H. Dunn, T. Thomas H. Napper, P. Caughlan, W. McRitchie, and T. Johnson (Hon. Sec.).

HOMESTEAD MEETING.—This meeting was held at Sandal Park, the residence of Mr. G. H. Dunn, who showed a number of his ingenious inventions. The first was a machine to remove bunt and smut from wheat, and to divest the whiteheads of their chaff, and thus ensuring a very clean sample. Owing to the vigorous action of the machine some members thought that the germinating power of the grain would be injured, but Mr. Dunn assured them that such would not be the case, and to prove this he would sow a certain number of grains after putting the bulk through three times, and report results. He proposed to make a larger machine, with a view to putting through a much larger quantity per day. He then showed an improved flexible wire gate, with special lever and self-acting lock. This can be made of any reasonable length, and will tighten up with certainty directly the gate is closed. This is convenient in giving access from one paddock to another by live stock, binders, and other implements which require considerable space. A machine for punching clear holes through hoop iron was shown, also a handy light vehicle for riding behind and attached to harrows. A pickling tank to treat 4bush. of seed wheat at once was much admired; also a strainer, by means of which wire in any position can be strained. In the garden quite a number of kinds of vegetables, etc., were growing rapidly. The fruit trees were strong, healthy, and productive. An afternoon tea was provided, and thanks accorded.

Inkerman, May 23.

Present—Messrs. S. Diprose (Chairman), D. J. Strongman, E. M. Hewett, W. Board, D. Fraser, C. H. Daniel, J. Lomman, G. Peter, W. A. Hewett (Hon. Sec.), and one visitor.

FARMERS' PERMANENT RELIEF FUND.—It was unanimously agreed—"That this Branch is not in favor of the establishment of such a fund."

SKIM-PLOUGHING.—Members agree that in this district the cleared scrub lands give best results when ploughed shallow. Mr. Strongman has made himself a plough of scrap iron, with mould-boards so constructed that six horses

can work this six furrows with more ease than four horses work three furrows with the old pattern boards.

DRILLING FERTILISERS WITH SEED.—Mr. E. Hains, of Balaklava Branch, has drilled seeds with fertilisers for three seasons, and thinks that any one cropping 200 acres or more should procure a drill. Tests should be made with various manures. He had got best results with Thomas phosphate.

Gawler River, May 26.

Present—Messrs. A. M. Dawkins (Chairman), T. P. Parker, J. Hillier, D. Humphries, H. Heaslip, A. Bray, J. Badman, F. Roediger, H. Roberts, J. S. McLean, H. Roediger (Hon. Sec.), and four visitors.

“THE FARMER'S TABLE, AND WHAT TO GROW FOR IT.”—This was the title of a paper read by Mr. H. Roediger, as follows:—

The table should be provided with bread made from wheat crushed fine enough (sample exhibited), leaving bran and pollard in the flour to make it wholesome and easily digested. Butter, milk, and eggs ought never to be purchased by farmers, except under extraordinary circumstances. Supply of beef and mutton must depend upon the extent of holding and its capability; but some pork, especially ham and bacon, should be provided. The pigs can be fed upon the refuse from the kitchen, dairy, and garden, supplemented with a few acres of Cape barley. This item will be particularly handy during hot weather, when fresh meat can hardly be kept good. Sausage made from pork, &c., if properly made and kept in a cool place, will keep good for a year or longer (sample exhibited). Farmers should grow their own vegetables (including potatoes, if he has a suitable position). On the plains the major number of varieties can only be grown during a limited period, but if the best hearts of cabbages are salted and sliced, the farmer can have cabbage as good as fresh all the year round. [Pumpkins, piemelons, and squashes can be kept good from one season till the next.—GEN. SEC.] On most farms there is a spot favorable for growth of fruit trees, and some of the fruit can be preserved or dried, or made into jam, &c. By the use of the lever-top cans, it is possible to have fruit nearly as good as fresh all the year round. Raisins and currants can be produced on nearly every farm. By using the bar-frame hives, any one who is not afraid of bees may secure a good supply of honey for the table and kitchen use. Where much coffee is used, a great saving may be made by roasting and grinding some skinless barley to mix with it in place of chicory. A small plot of skinless barley should be grown every year for this purpose. Some people use wheat, rye, carrots, peas, or bread, but I prefer skinless barley to all.

The Chairman thought it might pay, where a holding is limited, to sheep-proof fence a few acres of land, buy some sheep in store condition, and fatten by hand feeding for mutton. Members were of opinion that it will not pay to feed pigs on wheat alone.

RAINFALL.—For May, 1.97in.

Forster, May 22.

Present—Messrs. A. Johns (Chairman), J. R. Bolt, A. Ratallack, S. Sears, J. Johns, J. Ratallack, F. Johns, A. E. Prosser, J. D. Prosser (Hon. Sec.), and five visitors.

STUMPS.—Mr. J. Ratallack thinks that the burning of stumps and roots on the crops growing on cleared scrub lands does more harm to the crop than would be effected by carting them off. Mr. A. Johns holds the opposite opinion, whilst other members agree with Mr. Retallack.

SHOOTS ON STUMPS.—Several members advocate cutting off the shoots at 3in. from the stumps; others favor splitting the shoots away; but the majority agree with cutting them off with a hook.

POST HOLE SINKING.—After considerable discussion, the majority decided that dynamite is best to use for sinking post holes in heavy limestone country. About 3in. to 4in. of powder, well tamped, being sufficient.

RAINFALL.—For May, 0.45in.

Port Elliot, May 27.

PRESENT.—Messrs. P. O. Hutchinson (Chairman), J. Brown, H. Pannell, W. E. Hargreaves, H. Green, J. McLeod, and E. Hill (Hon. Sec.).

TUBERCULOSIS.—Some discussion took place upon the paper by Mr. C. J. Valentine on this subject. It was admitted that it is very difficult to detect this disease, owing to the varied symptoms and manifestations. Attention was directed to the difficulty of securing the attention of the Inspector of Sock, who is evidently very much overworked, or has his time taken up with work that someone else should be appointed to do. The Chairman read portions of the Health Act dealing with the keeping of diseased animals, or supplying milk or meat from the same for human consumption. Members seemed to think the provisions too stringent, but had to admit that stringency is necessary to the working of the measure.

EXHIBITS.—Mr. Hargreaves showed specimens of pumpkin (or squash), Turk's Cap and another variety, which turned the scale at 50lbs., after being gathered a week. They were grown, without watering, on stringybark country which two years ago was regarded as very poor. Mr. H. Green showed plant of peanut.

Orroroo, May 26.

Present.—Messrs. E. Copley (in chair), M. Oppermann, E. D. Kirkland, W. S. Lillecrapp, J. Jamieson, and T. H. P. Tapscott (Hon. Sec.).

HORSES EATING WHEAT.—Mr. Oppermann read an extract from a paper, and remarked that he had a large number of horses and always a quantity of wheat about, and had often been unfortunate in having the horses get their fill of wheat—as many as fourteen at a time. He always gave each of them a tablespoonful of carbonate of soda in a pint and a half of water directly he discovered that the horse or beast of any kind had been at the wheat, or show symptoms indicating that they have done so. *The remedy never fails.* Sometimes there is a stiffness of the legs; then he rubs in turpentine until the animal begins to become restless, when it is allowed to go. He allows them access to food and water, especially water. They will not die if this is done, as the wheat can do no harm when the acidity is destroyed in their stomachs. Another farmer who tried the same remedy said it saved him the loss of seven horses, valued at least £80.

BUNT AND PICKLE.—Mr. Oppermann does not think 5ozs. bluestone any too much for 4bush. or a bag of seed wheat. For Steinwedel, which he thinks is more subject to the disease, he recommends 12ozs. to the bag.

Golden Grove, May 25.

Present.—Messrs. T. G. McPharlin (Chairman), J. R. Smart, S. A. Milne, J. Woodhead, H. P. Day, A. Marr, J. Ross, and A. Harper (Hon. Sec.).

FERTILISERS.—Mr. Woodhead said the best way to treat farm-yard manure is to wheel it out and make a heap about 2ft. deep. When rain comes turn it over and make a heap about 4ft. deep, and move again when the fermentation becomes too strong. Mr. Milne thought a pit is better, so constructed that the moisture can be regulated, with an occasional sprinkling with gypsum to fix the ammonia. He deprecated the common practice of allowing flood waters to run in at one side of the manure pit and out at the other. The Hon. Secretary said he had long held the opinion that, weight for weight, new manure was as valuable as old, and scientific experiments conducted in different parts of

the world had proved such to be the case. It is, therefore, wrong to keep manure until 3 tons are reduced to little more than 1 ton in weight. Mr. Smart dissented, and said that most of the seeds of weeds are destroyed in old manure. The fouling of land with weeds is the chief objection to new manure, and such could only be applied to crops that will allow of the weeds being dealt with, or to some green crop grown for the ensilage pit, and where the weeds can be cut green and the land ploughed up for a summer crop. In this district, so far, none but phosphatic manures have been used. The Hon. Secretary thought it ridiculous to suppose that 100lbs of this fertiliser, or even a larger quantity of mixed manure, would keep the land in good heart for any length of time, and held that more organic matter must be supplied, either by growing fodder crops, and keeping more live stock, running sheep, or ploughing under green manure. Mr. Milne recognised the need there will be in the near future for applying nitrogenous and potash manures, as well as phosphates; but, as the phosphates had been first to run out in our lands, this one element will be sufficient to apply for a year or two, by which time the other ingredients may become deficient.



INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Intercolonial Labor Federation.

An Intercolonial Labor Federation Conference was held at the Trades Hall, Brisbane, on May 4 and 5. Four colonies were represented, as follows:—Queensland—Messrs. C. McDonald, M.L.A., A. Hinchcliffe, and W. Kewley; New South Wales—Messrs. A. Edden, M.L.A., W. J. Ferguson, M.L.A., and S. Smith, M.L.A.; Victoria—Messrs. S. Barker, J.P., and J. G. Barrett, and Alderman J. W. Billson; South Australia—Hon. R. S. Guthrie, M.L.C., Hon. G. McGregor, M.L.C., and Mr. W. J. Strike. The conference had before it—(1) The Melbourne scheme of labor federation drawn up by the leaders of unionism in Victoria; (2) the scheme agreed to by the Seventh Intercolonial Trades Union Congress, held at Ballarat in April, 1891; (3) rules and regulations of the Queensland Labor Federation; and (4) amendments on the Ballarat scheme suggested by the South Australian Trades and Labor Council. Mr. W. Kewley presided over the meetings, and Mr. A. Hinchcliffe acted as secretary. It was agreed that the following scheme should be submitted to the various labor unions in the colonies as the report of the conference, with a recommendation for its adoption, and that in the event of three or more colonies accepting this constitution the secretary to the conference be instructed to call the first Federal Council together in Sydney in October next to inaugurate the Federation:—

Name.

"Australasian Labor Federation."

Constitution.

The federation shall consist of all labor organisations banded together for mutual assistance, and shall be governed as hereinafter provided.

Objects.

The following shall be the objects of the federation:—

- (a) To improve, protect, and foster the best interests of all classes of labor throughout Australasia.
- (b) To secure direct labor representation in the various Parliaments, and to promote and extend such legislative reforms as will ensure social justice to Australasian workers:
- (c) To prevent, as far as possible, any strike or dispute between the members of the federation and their employers by conciliatory means, and by appeal to any recognised board of arbitration.
- (d) To uphold the rules of all federated bodies and ensure justice to all their members.
- (e) To provide funds for the assistance of any federated union involved in a dispute, such funds to be used only after all conciliatory measures have failed.
- (f) To secure a better advocacy of the principles and rights of labor through the press, and, if deemed necessary, to establish journals for the promulgation and defence of all classes of Australasian workers.
- (g) To prevent the influx of colored races.

Headquarters.

The headquarters of the federation shall be situated at such place as the Federal Council may from time to time determine.

Organisation.

For the purpose of facilitating the working of the federation, its unions shall be grouped into districts governed by district councils—the district councils to be severally represented on the provincial council.

Provinces.

The provinces of the federation for the time being shall be: The Northern Province, comprising the present colony of Queensland; the Eastern Province, comprising the present colony of New South Wales; the Southern Province, comprising the present colony of

Victoria; the Central Province, comprising the present colony of South Australia; the Western Province, comprising the present colony of Western Australia; the Pacific Province, comprising the present colony of New Zealand; and the Tasmanian Province, comprising the present colony of Tasmania; or such of these provinces as may come under the jurisdiction of the Australian Federation.

Federal Council.

The Federal Council shall meet at least once in each year, and at such other times as may be considered advisable or circumstances demand, and shall be constituted of delegates elected by and from the principal councils as follows:—

Members	Delegates
500 to 2,000	2
2,001 to 6,000	3
Over 6,000	4

Four to be the maximum number of delegates from any provincial council.

The official seal of the federation must be attached to every document issued by the council, and no document emanating from the council shall be read or received by the provincial councils or the district councils unless the said seal is so attached.

Annual Meetings.

The annual meetings of the council shall be held at such places as may be agreed upon, each meeting to determine where the next shall be held, but it shall not assemble twice consecutively in the same place.

Expenses of Delegates.

The expenses of all delegates to the Federal Council meetings shall be defrayed by their respective provincial councils, and all delegates must be provided with credentials signed by the president and secretary of their provincial council, and shall not be permitted to speak or vote upon any question until such credentials have been accepted.

Powers.

The council shall be invested with the undermentioned powers:—

1. Control of the Federal Council funds.
2. To elect or remove any of its officers. All elections to be by ballot and by absolute majorities.
3. To decide all appeals against decisions of the provincial councils.
4. To order a plebiscite of the federation, when deemed advisable, upon any question.
5. To institute legal proceedings on behalf of the Federal Council, and direct the trustees to take action against any officer of the Federal Council who misappropriates its funds.
6. To carry out the objects of the federation in strict accordance with the general laws.
7. To frame rules and standing orders for the conduct of their business; such rules to be in conformity with this constitution.

Officers.

The officers shall consist of the president, vice-president, treasurer, secretary, and three trustees, who shall be elected at the annual meeting in February of each year. All officers must be delegates to the Federal Council, and shall be eligible for re-election, except the president, who shall not hold office for a longer period than twelve months consecutively, nor within twelve months of his last holding office. He shall have a deliberative and a casting vote.

Executive.

The executive shall consist of the president, vice-president, treasurer, and secretary. The powers of the executive shall be limited to the superintendence of the federation in the interim between the meetings of the council. It shall take every means to secure the due observance of the laws of the federation to further its objects and protect the funds. It shall direct the action of the trustees and be responsible for the rightful administration of the council's funds, in accordance with the instructions of the council. It shall have power to summon special meetings of the council when deemed necessary. It shall, on request from any provincial council or district council, determine as to the interpretation of any general law or decide any matter on which the laws are silent. The decision of the executive in all such cases to be subject to appeal to the Federal Council, whose decision shall be final.

Special Executive Meetings.

Any district council may, at a special summoned meeting called for the purpose, summon the provincial council to meet and consider the advisability of calling together the executive; and if such provincial council deem the matter of sufficient importance, they shall at once communicate with the secretary, who shall call the executive together as soon as possible after the receipt of such notice. The secretary shall, in convening the meeting, inform each

member of the executive of the special business to be transacted. The expenses in connection with such gathering shall be defrayed by the Federal Council, unless the executive in meeting assembled deem the object of such special gathering to be a frivolous one, in which case the expenses shall be borne jointly by the provincial council and the district council at whose instance it was summoned.

Trustees.

There shall be three trustees elected by and from the council. All moneys belonging to the Federal Council shall be banked or invested in the joint names of the trustees, treasurer, and secretary. All cheques or withdrawals shall be signed by at least two trustees, treasurer, and secretary, and shall have the seal of the Federal Council affixed thereto.

Sustentation Fee.

Every provincial council shall pay to the Federal Council the sum of $\frac{1}{4}$ d. per quarter for every financial member existing at the end of their financial year. Payments to be made quarterly and in advance, from the beginning of the quarter in which they became affiliated.

Women's unions shall be admitted to full affiliation upon payment of half the above dues: Provided always that nothing in these laws shall prevent the district councils from making such further financial arrangements for internal government as may appear to them necessary, so long as such arrangements are not in contravention of these laws.

Defence Fund.

Each affiliated union shall pay to its district council the sum of 2d. per financial member per month towards a defence fund.

The district councils in the several provinces shall control their respective defence funds. Each district council shall report the financial position of the fund to the provincial council when it is deemed advisable. The provincial council shall report annually to the Federal Council the state of the funds of all districts within its jurisdiction.

Provincial Councils.

There shall be a provincial council in every colony, which shall consist of delegates from district councils incorporated under the scheme of federation. Every provincial council shall have the power of making its own laws, providing such laws do not conflict with the general laws of the Federal Council. Their duties shall be:

- (a) To take action in the event of disturbances
- (b) To organise political branches in their various provinces for returning to Parliament members who will support a platform to be agreed to.
- (c) To grant charters to and define the boundaries of any new district within their jurisdiction. The federation only to recognise as affiliated districts those working under such charter.
- (d) To act in conjunction with the executive of the district council and the union involved in directing operations when a strike or lock-out has been declared. In no case shall the whole of the members in any province be called out without first obtaining consent of the Provincial and Federal Councils.
- (e) Should a strike or lock-out occur, the provincial council in whose province the friction has occurred shall, if necessary, at once strike a levy of not less than 1d. per week upon members of the various unions in the province under their jurisdiction, and shall immediately communicate with the provincial councils of the other provinces, giving all information. If the province considers the matter too large to deal with they may submit it to the Federal Council. Should there be any surplus from the levy struck by the Federal or Provincial Councils it shall be divided *pro rata* between the various district councils, and placed to the credit of the defence funds.
- (f) To direct organisation in unorganised districts, and to work in unison with the district councils in solidifying existing unions.

Disputes.

1. In the event of a disturbance threatening an affiliated union, such union shall endeavor to settle the dispute peaceably; failing which, it shall submit the case to its district executive, who shall act in conjunction with the committee of the union involved. This joint committee shall endeavor to settle the dispute in a peaceful and friendly manner; failing this, they shall report to the district council, who shall, without delay, bring the matter before the provincial council.

2. In the event of an emergency or trifling dispute, the district council may decide by a two-thirds majority to take action in defence of the principles of the federation, without previously consulting the provincial council; but it shall submit its action to them with all possible dispatch. Under all other circumstances, before taking action, the district council shall place questions involving disputes before the provincial council, and shall be governed in its subsequent course by their decision.

3. Should a disturbance threaten in any province which, in the opinion of the provincial council, would have a tendency to spread beyond the limits of that province, they shall immediately communicate with the secretary of the Federal Council, who shall be empowered to call a meeting to discuss the situation. Any decision of the Federal Council involving action shall endow that council with the following powers of levy, unity, and censure within its jurisdiction:—

- (a) To levy a special contribution upon every employed enrolled member in its province, such levy to be of uniform percentage and to be made upon all earnings above 1's per week.
- (b) To censure, in the name of the federation, any corporation, firm, or individual whose conduct shall, in its opinion, show them to be unjust, cruel, or bitter enemies to labor; it shall communicate such censure where necessary to each provincial council for public notification, and it shall be obligatory upon members of the federation to give effect to that censure.

4. When it has been decided to assist an affiliated union, the provincial council shall make arrangements for financial support to the extent of a sum not exceeding 20s. weekly; such support to be distributed as between married and single men as the union involved may think fit: Provided that in no case shall such support be given during the first week of any disturbance. In the case of women's societies half the above rates shall be paid.

5. The federation reserves to itself the right of withholding assistance from any affiliated body entering upon a strike without having received the sanction of its provincial council.

The powers provided in these rules shall be exercised only upon a two-thirds majority decision of the Federal Council, which shall assume control of all disturbances in conjunction with the provincial council, and shall cease with the termination of the dispute.

District Councils.

District councils are empowered to make laws for their guidance and for the control of their business, but such laws must not be in contravention of this constitution. The current year for district councils shall be from January 1st to December 31st.

Alteration of Rules.

One-tenth of the members of the whole federation may petition the Federal Council to frame any new law or rescind or alter any existing law for the better working of the federation, and upon receipt of such petition, if the Federal Council do not agree to such petition, then a referendum shall be taken, and if the proposal be carried by a majority the same shall become law.

The Tobacco Industry.

Never before had our tobacco such a sweet and pleasant flavor.

The Song of Haiwatha (Longfellow).

Amongst the industries of South Australia the cultivation and manufacture of tobacco is not the least interesting and important. Tobacco is successfully cultivated as a branch of agricultural industry in Queensland, New South Wales, and Victoria, in each of which colonies experienced planters have been introduced by their Governments to instruct agriculturists in the best methods of cultivating and curing the leaf. Notwithstanding numerous trials have been made by both European and Chinese growers in favored districts of South Australia, no success has attended their efforts in producing a leaf which is suitable for pipe smoking, yet good leaf has been raised from time to time at Millicent and in saline soils near Port Adelaide. The number of tobacco factories are three, all situated in the city of Adelaide, one cigarette factory and eight or nine small cigar factories.

The Conqueror Tobacco Works, Light Square west (Robert Dixon & Co.), employ sixty-one men and boys, and ten women and girls. Of these thirty-two men are employed in tobacco-twisting, seventeen men and boys in the pressroom, eight men employed in the warehouse, two carpenters making up boxes, one man, one boy, and ten women and girls are engaged in cigar-making. The kinds of tobacco made are all kinds of dark and bright, twist and plug, and various cut tobaccos, all made from imported leaf. The number of hours worked by the women is forty-six hours per week, whilst the men work two hours a week longer. American sycamore is used for tobacco boxes, and

Spanish cedar for the cigar boxes. The employes of this factory have varied very little in number for the past five years, but the time worked until quite recently has been barely three-quarter time. The local manufacturers, by improved manufacture and the use of the latest machinery, have steadily maintained their hold on the market, and unprejudiced opinion agrees that there is little to choose in appearance or in smoking quality between the best imported and the best colonial tobacco.

The Virginia Tobacco Factory, Wm. Cameron & Co. Proprietary, Limited, of Grenfell Street, employ fifty-one men and six women and girls. The men employed are one engineer and an assistant, the others in twisting tobacco, preparing leaf, and in the pressing room the women and girls in making plugs and other general work in the factory. The tobacco made is Eureka and Havelock brands, twist and plug of all sizes, some dark, some aromatic, all of which is made from imported leaf. Imported sycamore lumber is used in this factory for making boxes, there being no colonial timber suitable for tobacco boxes.

The next factory of importance is that of The Excelsior Tobacco Works. Messrs. Dungey, Ralph, & Co., Limited, Hurtle Square, have fifty-four men and boys working in their factory. No women or girls are employed. The principal work is in the manufacture of tobacco and the making of cigars, the kinds made up being twist, plug, and cut tobacco. American leaf is used for making tobacco. American and continental leaf is used in the production of cigars. One man is engaged in making tobacco boxes, and two men on cigar boxes, which are made from imported sycamore and Havana cedar. The tobacco industry is suffering in common with other local industries from the general depression which has existed in South Australia during the past three or four years, and one factory reports that trade at present is extremely dull, and principally confined to South Australia. Border duties preclude trade with the other colonies to any extent.

The only line in which the Adelaide manufacturers are unable to hold their own is in tobaccos which are packed in fancy tins. These tins are unable to be made in the province, and the duty at present levied by the Customs is too heavy to enable them to be used by local manufacturers if imported from outside countries.

It is believed by experts that the finest kinds of tobacco could be grown to perfection in our Northern Territory. South Australia imported in 1897-98 manufactured and unmanufactured tobacco 656,434lbs., of the value of £37,845, and exported 175,948lbs., of the value of £14,522; also 66,348lbs. of cigars and cigarettes were imported, of the value of £19,501, and of cigars and cigarettes 20,194lbs. were exported, of the value of £8,979.

The Labor Bureau.

The number of persons for whom employment has been found by the Bureau under the Government and private employers since March 1, 1899—Laborers, 930; masons and bricklayers, 15; stonebreakers, 38; carpenters and cabinet-makers, 20; boilermakers, assistant boilermakers, riveters, blacksmiths, and strikers, 26; brassfinishers and coppersmiths, 4; patternmaker and meterfixer, 2; moulder and plumber, 2; shipwrights and fencers, 8; tinsmiths and drillers, 3; painters, 13; porters and youth porters, 13; youths and nippers, 31; stone and granite dressers, 7; gangers and caretakers, 2; farm hands and gardeners, 10; baker, 1; sculleryman, 1; yardman, 1; survey hand, 1.—Total, 1,135. The total number of persons who have been employed through the agency of the Government Labor Bureau since October last is 2,800.

Woman's Work and Wages.

BY INSPECTOR AGNES MILNE.

It seems to me the more we think and study the problem of "Woman's Work and Wages," and the remuneration she receives for her labor, the more complicated the situation becomes.

In a recent article in this *Journal* I referred to women having to work long hours for very small pay. Nor do I find that the lapse of time, or skill, has bettered the conditions of the workers; but the evils spoken of by the late Sir John Cox Bray, some years ago, are now in our midst.

We have in our city 4,000 female workers, and these do not include telegraph and telephone operators or clerks, but independently of these many and various are the employments of women; but I intend to deal only with employes in the clothing trade at this juncture.

I find upon close investigation that the trade is very much cut up to-day to what it was some years back, and although skilled and good operatives, both male and female, can command good prices, they are few and far between, for the unskilled worker far outweighs the skilled worker in every branch of trade.

In years gone by an apprentice would be taken on after the first month at 2s. 6d. per week, and taught the trade in its separate branches—coat, trousers, or vest making—and then be turned out a skilled worker, so that at the end of her term of apprenticeship, as improver, she could command good wages and earn as much as £2 per week; but to-day the rule is, with very few exceptions, to take young girls on at the trade for a month for nothing, and then 2s. 6d. per week for six months; and, as far as I can learn, this practice is universally adopted, so that there are very few apprentices who are thoroughly taught their trade. And this is a very great disadvantage to many who have spent the best years of their lives at the trade, and who find it very difficult to keep up with the keen competition now existing.

While I know of many just and honorable employers who deplore the existing state of things, we cannot close our eyes to the fact that there are unscrupulous employers who are ever ready to take advantage of the dire necessity of the applicant. And I am sorry to say these are on the increase, and the "sweating" evil is fast taking hold of many of our workers, both here and in the other colonies.

Miss Duncan refers to this in her last year's report, and says the question of "sweating" has been prominently before us during the past year, and is one on which manufacturers of the best class speak and feel strongly, and her sentiments can be fully endorsed here, where honorable firms, known for many years as considerate employers, have at last been compelled to lower their prices in order to keep their factories open at all in the face of such keen competition.

Years ago we were warned that the system we were then living under was capable of abuse, and Sir John said that it was our duty to the best of our ability to prevent those abuses from growing. I contend those abuses have grown to alarming proportions, and are with us to-day.

The *Herald* tells us that the daughter of an East End (London) clergyman has lately been making an experiment in a match factory. She wanted to find out for herself how her poorer sisters were earning their daily bread, so disguised herself and obtained work filling match boxes. At the end of the week she received 2s. 3d., and was told she had done very well for a beginner.

The cost of lodging in this neighborhood was 2s. or 3s. for one room, 1s. 2d. to 2s. for a bed, so that if she depended upon her earnings, as many girls do,

she could only have afforded half a bed, and would have had rather less than 2d. per day to live upon, and must have either starved or solved the problem of existence in ways destructive to both soul and body.

In our own city things are drifting to much the same level, and I have it upon good authority that clothing can be made up as cheaply here as in the East End of London, and hundreds of tweed trousers are being made for 7d. a pair; and some who have been at the trade for many years, but who are worn out in the struggle for existence, can scarcely keep themselves alive.

It is affirmed by all persons in the trade that there has been a steady fall in prices during the past few years, and this is attributed to the desire of the public for cheaper goods. Mrs. Lynn Linton, writing to the *St. James Gazette*, says that it is the women themselves who beat down prices.

At present I can see no solution of the workers' problem—for it is the same in all classes of trade—but by legal enactment fixing a wage board, and thus I am sure we shall materially be able to help those workers who are so powerless now to help themselves.

Day Labor and Public Works (New South Wales.)

The report presented to the annual meeting of the Builders' and Contractors' Association on Tuesday deals trenchantly with the much-discussed question of day labor on Government works. Latterly there has been a growing demand for the extinction of the Government contractor, and the appointment in his stead of overseers amenable to political influence. This, it is contended, would enable the men employed on public works to get better terms than under the present system, without involving any extra cost to the taxpayer. The contractor is represented as a rapacious middleman, who sweats both parties, compelling the State to pay more and the men to work for less than a fair thing. If he were abolished, therefore, it is guiltlessly supposed that the Government would get cheaper work and the men better pay. Isolated instances have been quoted to show that the substitution of day labor for the contract system has actually produced these results. To get a fair comparison between the two systems is a matter of some difficulty, as it is not always possible to say how much of the machinery of Government was employed on a particular job at a particular time. The proportion of official salaries properly chargeable against the work may, therefore, be much larger than is made to appear. But there is no need to lay any undue stress on that fact. Neither is it necessary to deny that special instances may be found in which the Government has succeeded in carrying out work by day labor at a lower price than a contractor would have undertaken it for. But against these can be set numberless examples of the generally ruinous cost of the Government stroke as compared with contract work. What it would cost if extended to every little job throughout the country is impossible to tell; but the fact is self-evident that, on the average of such works, competition prevents contractors from getting a penny more than the market value of their services as labor organisers. As a rule they make no more out of Government work than private work, on which there is no reason for paying anyone anything except value received.

It is often asserted that the service which a contractor can render in organising and directing labor could be rendered just as effectively by a State-paid official. With certain qualifications that may be true enough. In departments which are exempt from political control, and are, consequently, enabled to work on commercial principles, there may be no reason why the day-labor system should not prove as cheap and efficient as any other. Nevertheless, the general rule with private enterprise is to get important works done by contract wherever it is possible. The inference from this is that the contractor earns his money,

and comes cheap at the price. There is no other reason why he should be employed. A Government department managed like that of the railways might have the same facilities as a private employer for utilising day labor, but it could hardly have any more. Whether it worked the system successfully or not would, therefore, depend chiefly on the particular ability of the overseers whom it chanced to obtain. If these were men who, for a mere salary, would take the same pains to work economically as contractors, driven by the lash of competition, and compelled to make good any waste out of their own pockets, the cost might not be any greater. But, in that case, the labor employed could get no advantage, and it would be a matter of indifference whether the State engaged each man directly and at its own risk, or through the medium of a contractor, who took all the risk on himself. This is not by any means the ideal system as it appears to the political day-dreamer. What he sees in it is a guaranteed minimum wage, irrespective of market conditions, and payable to the unfit as well as to the fit. Also, an overseer, whose billet depends, directly or indirectly, on the political favor of the men who are thus employed. The Builders' and Contractors' Association denies that the day-labor system can be economically worked under these conditions, and that denial has the obvious support of common sense.

This question is one which has a most important bearing on the progress of the country, and the time is coming when it will require to be seriously faced. Already there is a noticeable tendency to extend the day-labor principle, not because of its commercial soundness, but as a means of placating a political section whose avowed aim is to override the law of supply and demand for the benefit of the men who have influence enough to get employment on Government works. And, in order to multiply the number of such billets, and eventually get for every workman the benefit of the Government stroke, there is a coincident opposition to private enterprise. If this goes on much longer in the way that it has been going, the most serious effects upon the country's development must be looked for. The artificial raising of the cost of Government works, so that labor may temporarily benefit, is sure to produce a reaction from which labor will be the heaviest sufferer. As soon as the cost exceeds the interest-producing limit, such works become a down-drag upon the taxpayer, whose power of keeping them going must speedily be exhausted. There is no political influence which can compel the capitalists who lend their money to the Government for the construction of public works to go on providing it at less than the current rate of interest, and when we become unable to pay that the works must be suspended. There is a distinct danger of that disaster happening as the result of the policy against which the Builders' and Contractors' Association has raised its voice. The worst effects of it would be felt by labor, which on artificial wage rate always tends to unduly concentrate wherever it exists. It may be said that the Builders' and Contractors' Association look upon this matter from an interested point of view. Possibly it does. But from any intelligent citizen's point of view what it indicates is none the less clear.—*The Sydney "Daily Telegraph."*



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NOTES AND COMMENTS.

The prospects for the season show a marked improvement as compared with last month. The whole of the farming area and a considerable extent of pastoral country has been blessed with rain, and those districts north and north-west of Petersburg, which have suffered so severely during the past four years for want of rain, have benefited, from 3in. to 4½in. having been recorded along this line of country. Feed and wheat will now make progress, and farmers in these localities are becoming hopeful of at least a fair crop this season. In many localities the crops which started with the early rains have advanced too rapidly, and have had to be fed off with sheep.

A few years since, when several large estates on the Darling Downs and elsewhere in Queensland were opened up for wheat-growing, glowing reports were published concerning the capabilities of the country and the splendid opportunities afforded to farmers to take up land. Yields were quoted and compared with South Australian returns, much to the disadvantage of the latter. A number of South Australian farmers removed to Queensland, and took up land for wheat-growing, but in some cases at least they have not bettered their condition. According to published reports from official sources, nearly one-third of the area on the Darling Downs sown to wheat failed to produce even a bit of feed for stock; while a considerable area was affected by rust. The great expectations have so far not been realised, owing principally to climatic conditions; and we venture to assert that farmers in South Australia have less to contend with, and have equally, if not better, prospects than those of the sister colony of reaping a profit from wheat.

It cannot be too strongly emphasised that "pure white" bread is unwholesome. This absence of color is secured at the expense of the gluten and phosphatic and albuminous constituents of the wheat. The flinty wheats are stronger in every respect than the soft wheats so much in demand amongst our millers and wheatbuyers, incited thereto by the bakers, who are again controlled by the public requirement for "white" bread. The hard wheats and red wheats bring higher prices than our soft wheats in European markets; they are far more resistant of red rust than the great majority of our soft

wheats; they are stronger, as a rule, in their growth, and yield more abundantly. Why then do we continue to grow soft wheats and consume white bread? The darker bread is sweeter and nicer and more digestible and more nourishing. Is the solution to be found in our milling machinery being suited only for grinding the soft "good milling" varieties?

In the *Australasian Pastoralists' Review* Mr. T. Rowe, of Glenfine Estate, near Cape Clear, Victoria, states how he converted plains and honeysuckle country from cold poor pasture to land that makes first-rate lambing paddocks. On the estate in question there are about 3,000 acres under pines and bluegum, spread at some distance apart over the whole area. When a honeysuckle tree fell a young pine or bluegum was planted in the middle of the dead branches, and so protected until out of reach of stock. Not much expense for labor and none for fencing was incurred, and now these paddocks, although heavier stocked than any other portion of the run, were the only ones from which a fair percentage of lambs was obtained last season.

In a recent issue of the *Australasian* some interesting particulars are given of the improvements effected by Messrs. E. C. & J. L. Stirling in their Nalpa sheep. In 1898 the flock averaged 9lbs. 12ozs. from 9,916 sheep, including 2,594 lambs. The grown sheep of all ages averaged 11lbs. 10ozs., and lambs 4lbs. 11ozs. The clip realised a net average of 5s. 4½d. per sheep and lambs. In 1879 the clip at Nalpa from 9,790 sheep and 3,436 lambs averaged 5lbs. 7ozs.; in 1883 the average was 7lbs. 2ozs.; in 1889, 8lbs. 10ozs.; in 1895, 9lbs. 4ozs.; and in 1898, 9lbs. 12ozs. This shows an increase of nearly 90 per cent. in the twenty years, and is a splendid testimony to the results which can be accomplished by enterprising and skilful stockowners. That the owners are able to furnish returns of this nature for a period of twenty years shows that careful record and watch has been kept of every circumstance affecting the welfare of the sheep.

Blindness, or ophthalmia, in cattle is often prevalent in this colony. It is satisfactory to note that the treatment recommended by the Chief Inspector of Stock, viz., bathing the eyes three times daily with a solution of 4ozs. tincture of opium in a quart of warm water, proves successful in curing the trouble. Where possible the animals should be kept in a dark place, and in summer have a damp cloth over the eyes for a few days. In obstinate cases it is sometimes necessary to continue the treatment for several weeks.

In Canterbury district, New Zealand, the local authorities have paid this season over £3,000 for eggs and heads of blackbirds and sparrows, representing in round numbers the destruction of 4,000,000 birds, and still they seem as numerous as ever. In one day over 28,000 eggs were received by one of the road boards, and it is stated that men and boys have made from £1 10s. to £2 per week collecting eggs and heads. What an enormous sum has the injudicious acclimatisation of these birds cost the Australasian colonies.

The *Australian Agriculturist*, in the June, 1899, issue, publishes the surprising information that the round seeds of a perfectly ripe apple will produce trees yielding fruit like that from which they were taken, whilst the flattish seeds of the same apple will produce crab-apple trees.

Size for paperhangers' use is now made in large quantities in Germany and America from skim milk. One factory in the United States used thirty tons of skim milk per day in making ten tons of size. Another substance called "faracurd" is made from skim milk, and bakers and confectioners use it in place of eggs. Skim milk is also utilised in the manufacture of dog biscuits, and, with finer meal, for table biscuits and bread. The only part of milk that is not generally utilised now is the sugar contained in whey, and that will soon be manufactured by the aid of machinery already invented.

Vines, if thoroughly irrigated some time about July or August, are most likely to yield very heavy crops of grapes. Mr. Thomas Hardy adopted the plan of making moderately shallow channels between rows of vines, with a very slight fall, so that the rain-waters should be collected or stopped on their way down hill, and thus the larger portion would soak into the soil. Some other vigneron and fruit-growers have improved upon this by placing bars of soil across the channels, so that the water is retained in troughs of soil, as it were, and a much larger soakage is ensured. There is a power of suggestiveness in this practice.

The Mediterranean fruit fly has been discovered in three separate orchards in Launceston, Tasmania. According to Mr. A. M. Lea, the Tasmanian Government Entomologist, on February 13 forty-two cases of peaches from Sydney were found to be badly infested, and were seized and held pending receipt of instructions. These were wired back, but ten hours elapsed before the fruit could all be boiled, and in the meantime numbers of maggots had escaped from the cases. One of the affected gardens is very close to the yard where the fruit was destroyed, and there is no reasonable doubt of the cause of infection. The other orchards are half a mile away, but close to the shop, the owner of which imports considerable quantities of fruit from Sydney. Every effort has been made to check the spread of the pest, but of course the result will not be known till the spring and summer. Should it appear in other parts, heroic measures will doubtless be taken to cope with it, as it will be a national calamity if it obtains a hold in the island colony.

It is most important that, on the appearance of any new pest, there should be machinery and money to hand with which to make a vigorous onslaught on the enemy. If action is delayed until Parliament can provide the necessary money, or enact required laws, the trouble may get beyond control, and for this reason most of those interested in the vine-growing industry will note with pleasure the improved prospects of obtaining the passing of the *Phylloxera Prevention Bill* this session. It is probable that in districts not infected by codlin moth growers would do well to obtain power to form fruit boards, with power to levy rates on all orchards and appoint inspectors. If this were done it would be possible, in some districts at least, to require the fumigation of all fruit cases before allowing them to enter the district.

Considerable quantities of plants are being introduced from the adjoining colonies, and they are usually packed in dried grass and other growths from the neighborhood of the exporting nurseryman. All such packages are opened for inspection in the office of the Agricultural Bureau, and portions of useless weeds, containing seed heads, are often noticeable. It is through this packing that weeds are generally introduced to new countries, and it behoves our people who receive plants from other colonies, or from local nurseries, to carefully collect and burn all such packing material, and remove all the soil from the roots, and burn it; otherwise they will probably introduce to their gardens such weeds as "soursofs," nut-grass, &c.

Before planting forest trees, break up and pulverise the soil to a depth of 12in. with a plough. Enclose the place against trespass by animals. Plant the trees 6ft. apart, and thin out when they are 6ft. high to 12ft. apart. When they are 24ft. high remove each alternate tree. Keep the surface harrowed or loosened to a depth of 2in. First year it may be necessary to give a little water during hot dry weather, then cover the soil with litter for a distance of 2ft. around the stem of each tree. Pines do well on sandy soils; sugargums thrive almost anywhere. *Tamarix gallica* will grow even in salt soils.

A very general complaint against shelter belts of trees adjacent to orchards, vineyards, and gardens is that they rob the soil and prevent the cultivated plants in properly developing and maturing. It must not be forgotten that the shelter assists materially in increasing the productiveness of the remainder of the field beyond the influence of the roots of the sheltering trees. If olives or almonds are employed in suitable localities, their crops of fruit would partially, if not altogether, compensate for the land occupied. In no case should a shelter belt stand within a distance of 60ft. from the cultivated field, garden, orchard, or vineyard which it is intended to protect. Neither the olive nor the almond will bear good crops of fruit where exposed to cold, bleak, and strong winds during the flowering period.

It will be of interest to dairymen to know that injurious germs, &c., in milk and cream vessels can be destroyed by a boiling solution of ordinary washing soda; 1lb. soda to 6galls. water. This has been proved to act as a complete disinfectant. Scalding the receptacles with steam or boiling water will remove all traces of the soda.

In Canada farmers grow sunflowers for mixing with maize and beans for ensilage. The maize is cut when the corn begins to glaze; the beans when the seeds are fully grown; and the sunflowers when the seeds are just ripe. One ton of sunflower (plant, seeds, and all) is chaffed in with 8 tons of maize and 2 tons of bean plant. Three pounds of sunflower seed is enough for an acre of land. The soil needs to be deep, rich, and loose or friable, and should be often cultivated during the growth of the plants. As with maize, sorghum, etc., every year the crop must be carefully gone over in order to select the very best heads for seed. If this is neglected, the following crops will become poorer and poorer.

POULTRY NOTES.

By D. F. LAURIE.

Recently several readers of the *Journal* have written asking further particulars about "The Australasian Book of Poultry," by Mr. A. J. Compton. For both the fancier and the utility breeder I consider this an admirable work. It is published by Messrs. George Robertson & Co. The price is £1 1s., which is very moderate.

I am often asked—"What profit, by the sale of eggs, can be made per hen per annum?" For three years Mr. Wylie, of Kapunda, kept an average of about 300 selected laying hens, the annual net profit from each was slightly over 10s. It need hardly be said that this excellent result was only obtained by selection of stock and careful, systematic, and unremitting attention. So convinced is Mr. Wylie of the value of pure blood of the laying breeds, that he has procured some excellent Minorcas to breed improved layers from. Further, chicken and duckling breeding will be combined with the routine of the dairy factory, and to this end a high-class incubator has been purchased from Messrs. Vardon & Hercus, Adelaide.

After sixteen years' experience with various patterns of incubator, I have come to the conclusion that a good one is the cheapest. By "good" I mean not only the material it is made of, but also its mode of construction. It is not sufficient to have a machine which will hatch eggs—we want one which hatches strong healthy birds. A handy man, who can handle a soldering iron and use a few carpenter's tools, can build, in his leisure hours, a good incubator of good design which will last for years and give good results.

Concerning soft-shelled eggs, Mr. Richard Woods, one of the leading writers of the day in England, says:—

It does not appear to be generally known that the laying of soft-shelled eggs is frequently caused by over-feeding, or by feeding with unsuitable grain. Yet such is the case, and the injudicious use of spices is often productive of a similar result. Indeed, I am of opinion that the all too common practice of "seasoning" the soft food with cayenne pepper and other aromatics, in order to stimulate egg production, is calculated to act injuriously on the parts of a hen in which the eggs are formed, and also on the passage therefrom. It is a mistake to try and force nature by giving much over-heating food, and in this category I place hempseed, barley, and buckwheat. The absence of shell-forming material will also cause the laying of soft-shelled eggs. A sudden fright, such as the fowls being chased by a dog, is likely to cause the hens to lay prematurely. If over-feeding is the cause, a little alterative medicine should be given. Epsom salts fulfil all requirements; a pinch, between the finger and thumb, may be administered every morning for a week or so, or a tablespoonful may be added to $\frac{1}{2}$ gall. of drinking water. As regards food, the grain supply should be diminished, and an increased quantity of vegetable be served instead. Under the heading of unsuitable grain, maize, owing to its fat-forming elements, stands first on the list, then follows hempseed, and lastly comes barley, for, excellent as the latter is for winter feeding, it is of too heating and forcing a nature to be used freely in warm weather. The baneful effects of spicy or highly-seasoned condiments cannot be gainsaid, and this fact should prompt their discontinuance. If shell-forming material be absent from the run, a plentiful supply of calcined or burnt oyster shells, some lime scraps, as well as some bones broken in quite small pieces should be provided. Fowls being partly gaminivorous they cannot be kept in condition and health for any lengthened period without green food of some sort. All stock—beast or bird—intended for breeding purposes should receive careful attention at all times, be liberally but judiciously fed, and the more exercise they get the stronger will be the offspring.

About ten months ago, on my return from a visit to the Sydney show, I gave some particulars about a large duck farm near Sydney, and purpose now to give further details. It may be noted that while the price per dozen eggs is a fair average price for duck eggs in this colony, the returns per pair for prime ducklings, viz., 4s. 4d., is far below what we should get through the Produce Depot.

A Sydney paper discussing a pamphlet published by the New South Wales Government, which sets out particulars of Mr. S. Ellis's duck farm, and his methods of fattening and raising stock, says :—

It is easy to speak in broad terms of the profits of systematic poultry keeping, but how much more satisfactory is it to give an illustration in exact figures of what actually has been, and, therefore, can be made at the business. The following statement of the actual amounts received and paid out by Mr. Samuel Ellis, of Botany, makes interesting reading :—

RECEIPTS.		£	s.	d.
Sale of 3,056 pairs of ducks, averaging 4s. 4d. per pair	662	16	4	
Sale of 12,244½ dozen eggs, averaging nearly 9d. per dozen ...	456	19	2	
Sale of refuse, including empty sacks, tallow, bones, &c.	92	1	5	
Total	1,211	16	11	
Less expenditure	1,008	16	6	
Credit balance	£203	0	5	
EXPENDITURE.		£	s.	d.
Feed	617	8	0	
Wages	170	7	0	
Commission on sales	44	17	5	
Purchase of fresh stock, ducks, &c.	46	12	0	
Interest on capital and other expenses	129	12	1	
	£1,008	16	6	

Thus the clear profit on the year's operations was £203, which must be regarded as very satisfactory indeed, even though it does not bear favorable comparison with the credit balance of £363 shown for the previous year. This falling off, however, is almost entirely due to the high price of feed throughout last year, a circumstance, of course, over which Mr. Ellis had no control. His feed bill alone was £209 greater than in 1897. Potatoes, for instance, which under ordinary conditions would have been largely used, were at a prohibitive price all the year, and consequently never entered into the bill of fare. Then again the animal food was more expensive, and there is an increase in this direction of £60. In an ordinary season the feed bill would be very appreciably lower. The eggs averaged 2d. per dozen less than for the previous year, but this must not be taken as meaning that eggs were actually that much cheaper on the average. It was entirely due to Mr. Ellis having very few eggs to sell during the first half of the year, when they are very much higher than during the latter half. Mr. Ellis made the fatal mistake of selling his early 1897 spring ducks; consequently he had but few layers until the end of July. He estimates that this error cost him fully £100. The ducks averaged 1d. per pair less for the year, but sales show an increase of 280 pairs, while he also had an increase of 1,320 dozen eggs. Of the 12,242 dozen eggs, 1,750 dozen only were sold during the first half of the year, and the remaining 10,492 during the latter. The monthly cost of feed ranged from £28 in October to £96 in August. It will be noticed that the expenditure has been charged with £46 12s. for fresh stock, but as it is simply an account of money paid and received, nothing has been put down for increase of stock. As a matter of fact, however, there were 1,400 more ducks on hand at the end of the year than at the commencement, and this at the average of 4s. 4d. per pair, or £150 13s. 4d., might most reasonably be added to Mr. Ellis's income for the year. The business is carried on on a block of six acres of very sandy soil, mostly covered with teatree scrub, rushes, &c. Water is obtainable at 12ft.

From the above account it will be seen that even with the local Sydney market a very satisfactory balance remains. By breeding a superior class bird and shipping to England a much better result would accrue. From what I heard in Sydney the Chinese are the best customers for ducklings, but they will buy none but the best. We may take it as an axiom that a good layer is not an ideal table bird. But all are agreed that the egg production of the average duck can be much increased without sacrificing the table properties. I have suggested that a careful infusion of Indian Runner blood would achieve this end. Many inquiries are of late to hand *re* this breed of ducks. Through the courtesy of Mr. S. Pitman of Payneham, I am enabled to give an interesting detailed account of the year's record of nine Indian Runner ducks. These nine ducks were hatched on November 16, 1897, and one began to lay on

May 21. The following are the monthly totals :—May 21 to 31, 25; June, 151; July, 206; August, 248; September, 234; October, 249; November, 205; December, 169; January, 111; February, 32; March, 15; April, 110; May, 1 to 21, 136. Total for the year, 1,891. Average per duck, 210·1. The average weight of the eggs was 2½ozs. The total weight of the eggs laid during the year was 295lbs. Nine ducks, hatched last August, have laid 753 eggs during the first five months of this year. Mr. Pitman further reports, "After eighteen months experience with the Indian Runner duck I am more than satisfied with them. They have in every way fully demonstrated their excellent reputation, being quick to mature, good foragers, and marvellous layers, as the accompanying list shows. I commenced hatching ducklings in July last, and continued all through the summer and autumn with good results; those hatched in January, February and March, matured well, thus proving that, with ordinary care, they can be reared well all the year round, and by so doing ensure a constant supply of eggs." I should be very pleased if a few more would take the trouble to collect similar records of the various breeds of poultry. Such records are of value. Where the stock is not bred for sale as high-class stock, a statement of receipts and expenditure would be interesting. We only want a well-timed stimulus to make the poultry industry go ahead and take a position as one of the most solid importance to the colony at large.

The South Australian Dog and Poultry Society has curtailed the schedule as regards Dorkings. When the Government acceded to the request for funds for special prizes, one of the main points was to encourage those breeds most suitable for the production of birds fit for export; a great effort was made to popularise the colored Dorking, which all who have studied the matter, consider the most suitable for crossing with the Indian Game. There has always been good competition of late years in colored Dorkings, and more might be expected; the inclusion of Orpingtons I cordially agree with, but the lumping of colored Dorkings and others is a great mistake.

It is with regret that I hear that signs of diphtheritic roup are to be found near Adelaide at present. Even if the throat and mouth are not affected, the eye is; the first apparent sign being a whitish spot on the eye, generally close to the pupil. Later on the eye swells, and on dissection is found to be invaded by a malignant growth; when such a stage is reached the eye must be sacrificed by excision, and even then there is danger. In the early stages chlorinated soda in solution is fairly effective; in the latter stages relief is doubtful; iodoform, in many cases, proves of great service, especially in conjunction with roup paste, for which I shall be pleased to send a prescription to anyone. Whenever a bird looks out of sorts, isolate it; there is nothing like taking a disease in its early stages. Disease should not exist if poultry are kept as I have frequently advised; neglect often results in severe penalties.

MUSHROOM CULTIVATION.

In order to be able to grow mushrooms with success it is necessary to have a plentiful supply of fresh horse manure, and to possess a cellar or pit where a temperature of about 60° F. can be maintained. As this is the normal telluric or earth temperature at a depth of 12ft. to 20ft., it can be kept at that heat by properly covering it over. It would be well if the walls could be of brick, and that the floor should be of slate slabs or cement; but this is not imperatively essential if the natural floor and walls consist of stiff clay. In cool localities the sheds and beds may do above ground. The temperature of the beds may go as high as 80° F. without injury to the spawn. Draughts, either cold or hot, are not beneficial in any way, and tar or any other oily or strong-smelling

material should be avoided in the mushroom house or pit. The beds may be made upon shelves, one above the other if room is scarce, leaving about 2½ft. between them. The depth should then be 18in. to 20in. The best form of bed is 3ft. wide at base with conical surface, rising to 2ft. 10in. or 3ft., upper width 2ft. 4in., any length, and upon the surface.

Get a sufficiency of fresh horse manure. Avoid all exposure to sun or rain, pile to a height of 4ft. and 4ft. wide. Separate all the coarse straw or bedding. Beat down the pile firmly with the back of the spade. After ten days turn the bed, or earlier if the temperature in the middle rises over 150° F. Turn the heap inside out, outside in, and end for end, so as to ensure good decay. In about ten days more repeat the operation, and so on until the centre of the heap indicates 90° F. About three weeks is usually required to get the manure ready for the beds. If any parts show a tendency to dryness use a little water. If the heap turns soapy or smells musty it must be rejected, and fresh manure procured. When well prepared the stuff is almost without odor, and will be mellow in the hands. French spawn is generally the best, but is not often procurable. English spawn is in the form of thick tiles, pressed.

When the bed is made, and at a temperature of about 85° F.—not over—make holes 4in. deep with a dibble, at 10in. apart; put a piece of spawn 1in. square in each hole, fill each hole with the compost, and wait about ten days; then spread evenly over the whole bed a layer of loam 2in. deep, and press it down with the back of the spade, and cover with 3in. or 4in. of straw. In about twenty to thirty days the mushrooms should begin to appear, and will continue to come up for three to four months. Towards the last a watering with warm water containing 1oz. saltpetre to 12qts. will invigorate the beds.

Some growers mix about one-third to one-half of fine sandy loam with the manure of the bed.

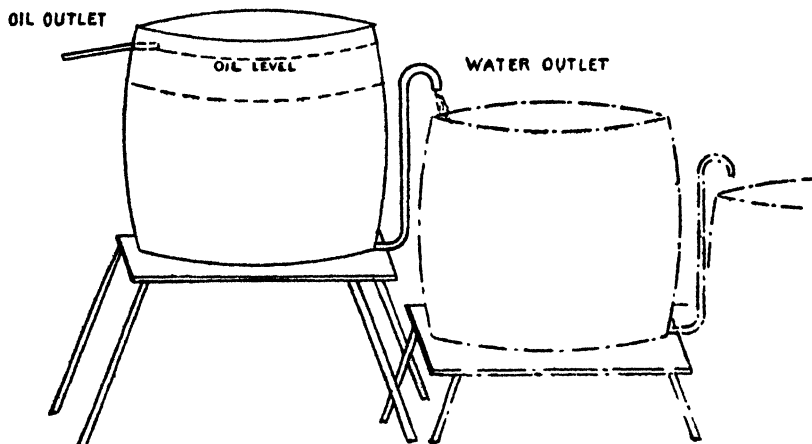
OLIVES AND MANUFACTURE OF OLIVE OIL.

The climate and soil of many parts of South Australia are splendidly adapted to the growth of the olive. Once in bearing the plantation is practically a permanent investment, bringing in satisfactory returns when properly attended to. The cultivation of olives has not received the attention in South Australia that its prospects justify. This is doubtless due to the fact that the tree is a slow grower, not bearing anything like full crops until from eight to ten years old. At present there are only three or four large plantations in South Australia, and these are all close to Adelaide. The largest is at Stonyfell, the property of the Stonyfell Olive Company, and consist of 100 acres, the average annual production of oil from same being about 2,750galls. The Adelaide corporation has about eighty acres of the park lands planted with olives, the fruit being crushed and the oil manufactured at the Adelaide Gaol. At Beaumont Estate there are about forty-three acres under olives; the production of oil averages 2galls. per hundredweight of olives. Besides these there are a number of small plantations round Adelaide and in various parts of the country, besides scores of places where from a dozen up to perhaps 100 trees are grown, principally for shelter for stock or for breakwinds for orchards and gardens. The agricultural statistics for 1897-8 give the number of olive trees growing in South Australia at 51,824. This would probably represent quite 800 acres, as from fifty to ninety trees are usually planted to the acre, while where only a few trees are grown they are often of large size and wide apart.

The local production of olive oil amounts to between 5,000galls. and 7,000galls. annually, according to the season. The oil meets with a ready sale, and is in high favor in the adjoining colonies, usually about one-fourth of the

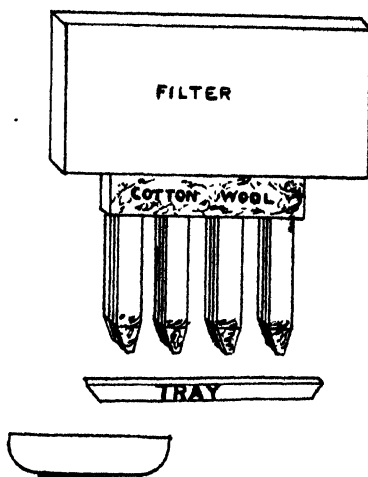
production being exported. In 1897 1,500galls. were exported, and in 1898 811galls. The importation of olive oil is very small, for 1897 only 3galls. being imported, while during the same period 1,600galls. of "salad" oil were introduced. How much of this oil is sold as "olive oil" to the consumer is a moot point. In 1898 108galls. olive oil and about 2,000galls. salad oil were imported. The principal makers of South Australian oil are Waverley Vinegar Company, Stonyfell Olive Company, G. F. Cleland & Co., Thos. Hardy & Sons, and the Adelaide corporation. Renmark bids fair in the near future to become a large producer of olive oil, as the trees do exceedingly well there.

Manufacture of Olive Oil.—The following notes on the process of extracting the oil from the berries will be of interest. On receipt of the berries at the mill they are first put through a crusher, which reduces them to a fine pulp. This work is necessary on account of the oil being contained in small cells in the berries which must be broken before the oil can be extracted. The pulp is then put into bags, and the bags placed in the press and subjected to powerful pressure to express the liquids from the pulp. The bags are in single rows on prepared trays of smooth wood with raised edges, the whole being on a slight incline. At the lower end the thick liquid—consisting of oil, water, and fine pulp—drains into a cask, which is fitted with an escape pipe for the water at the bottom and another for the oil at the top. The oil, being lighter than water, separates and rises to the surface, and the lower escape-pipe being brought to within a few inches of the top of the cask (as shown in the diagram) the water level in the cask remains stationary, the excess, as it



separates from the oil, flowing out of the escape-pipe. As the oil accumulates on the surface it flows out through the upper escape, which must be an inch or two higher than the surface of the other escape. In large factories the water, which carries with it small quantities of oil, is drained into other receptacles on the same principles, the oil saved being used for lubricating purposes. These receptacles are sunk in the ground to save having the press at an inconvenient height. They may be at a considerable distance from one another as long as sufficient fall is obtained. The oil after it comes from the press requires to be filtered. It is first placed in close vessels to allow the impurities to settle to the bottom, this process taking from a week upwards. The oil is then filtered, which in large establishments is done by means of automatic filter presses, which can be kept going night and day, and require very little attention. Those used at the Waverley Vinegar Company's works are the invention of the manager, Mr. G. C. Heyneman, who courteously

explained the various processes of manufacture. For persons dealing with small lots of oil, ordinary funnels and filtering paper may be used, but these require a lot of attention, and the process is very slow. A small filter suitable for use where up to 50 galls. have to be treated is shown in the accompanying sketch. It consists of a receiver to hold a gallon or more of oil, with twelve or more narrow tubes from the bottom of the receiver to the lower receptacle. Ordinary candle moulds are suitable for the tubes, the top ends of which are filled with cotton wool, the narrow bottom of the receiver being also packed with this material. The wool must be fairly compact; if too tight the oil will not filter through, and if too loose it does not filter properly. A little experience will enable the operator to arrange this all right. The filter is constructed of galvanized iron. After filtering the oil is at once bottled or placed in storage tanks. Three very important points in the treatment must be emphasised. They are—the berries must be ripe; absolute cleanliness is essential to the production of first-class oil; air and light quickly cause the oil to become rancid. The oil as it comes from the press must be removed without delay to the settling tank, which must have a close-fitting lid, and from the filter it must be at once placed in the storage tank or bottled. With persons making small quantities of oil the main difficulty will be to obtain the necessary pressure to express the oil from the pulp. The pressure required is enormous, and in the yard of the Waverley Vinegar Company's works a jarrah log 8 ft. long x 15 in. x 12 in. was seen which had been used as the short lever, and had broken under the strain. The oil made as described is classed as first quality, and the local product is equal to the finest made anywhere. The pulp is, however, treated again in hot water presses, the oil extracted at this operation being classed as seconds.



THE CULTIVATION OF THE OLIVE.

By OWEN CROMPTON

(Of the Stonyfell Olive Company, Limited, Adelaide).

The olive possesses one great qualification over almost every other known tree—that is, its permanency; once planted under suitable conditions and it lasts practically for ever. It attains an almost incredible age, and has been extensively cultivated for an unknown length of time. One of the chief features of the olive is the increasing of the yield. Let those who do not care to expend what is necessary for the establishment of a plantation, plant olive trees on the boundaries of their cultivated paddocks, and put the wires through the stems, as is done at Mr. Thomas Hardy's property at Banksie. By this means they occupy no ground required for more immediately profitable crops, and by putting in a few score of trees in this way farmers may try the experiment without risk of loss.

The olive is one of the most characteristic trees of the warm temperate and sub-tropical zones, as it suffers alike from excess of heat or cold.

Sandy, open stony, and limestone soils are very good for the olive. As a general rule soils that will admit air and moisture freely, but are not too rich, are suitable. Too much water about the roots is injurious, so that well-drained soils are necessary. The olive grows more and better fruit in well-drained warm soil, and the tree is most healthy and productive when the sun and air have free play all around and well into the body of the tree.

There are few trees which have so many means of propagation as the olive. This tree can be multiplied by roots, cuttings, suckers, truncheons, and by seed.

Cuttings 1ft. long may be taken from branches $\frac{1}{2}$ in. to 2in. in diameter, a heel of old wood being left at the thicker end and all twigs removed. These should be placed in well-manured and deeply-trenched beds, 1ft. apart, burying about 10in. of their length in the soil; in dry weather water them when necessary. Allow all buds on the cutting to develop, select the largest and tie it to the part of the cutting above it, and suppress the other shoots and buds. In a year the shoot will be self-supporting, when the end of the cutting may be cut off a little above it, and the wound coated with grafting-wax. These cuttings are afterwards removed to beds where they have more room to develop, and they are there trained into the desired form.

Suckers, which often rise from the roots of old trees, if strong and carefully and neatly detached with a heel, make good trees, as they afford a well-formed stem to begin with.

Truncheons are stout cuttings, from 1ft. to 10ft. long, and from 1in. to 6in. in diameter. They are planted horizontally, not vertically, and you can very often get as many as three or four trees from one truncheon. I know of a case in which an olive tree was cut down and sawn into a number of posts, which were planted; these pieces grew and are alive now.

Seeds of fully ripe fruit have the pulp removed by washing, as the oil adhering to them prevents germination. It may be necessary to rub the seeds against a brick to remove the pulp. They grow quicker when the shells are broken without hurting the kernel, but this is difficult to do. As a rule they are ready to graft about the third year.

The varieties of olive known to the modern cultivator are extremely numerous, but comparatively few are grown to any large extent. Out of the many kinds I can recommend the following sorts:—Gros Redoneau, Saloneu, Blanquet, Verdale, Boquettier, and Hardy's Seedling or Mammoth.

A very great deal depends on the kind how far apart olive trees should be planted. Some kinds ought not to grow more than fifty to the acre; others it would not matter if you had eighty to the acre. I believe in not letting the trees get too big for several reasons. It is very much more difficult to pick the fruit, the boughs are more liable to get broken, and you cannot plough close enough to the stem; therefore seventy or eighty trees to the acre is not too many, provided you do not grow crops between them.

The ground between the trees should be ploughed in winter to let the rain in, and if possible harrowed or scarified in summer to keep the soil loose and let the air in. Besides destroying the weeds it prunes the surface roots, which is good for the olive tree.

Not less important than ploughing is the pruning of the trees. When olive trees are regularly gone over every other year they will need so little being done to them that a practical pruner will do as many trees in a day as could be done in three or even four days where it is left undone for several years, and the abundant crops that are realised through regular attention will much more than pay for the increased labor. As soon as the tree has reached the intended height it must be topped, leaving three or four shoots selected to serve as the main branches. Of course these will be the latest growth near the top of the stem. Once the tree has attained a good shape there is little else to do than

to keep it clean from cross-branches on the inside to allow a free circulation of air, and to top such shoots as are growing too quickly and any that are growing so strongly as to weaken the others.

The small white flowers with four-cleft calyxes are borne on the previous year's wood, springing from the axils of the leaves. The fruit in South Australia sets in October and November, and ripens in May and June. It varies very much in color, shape, and size. The color has different shades of purple, green, and almost white; the shape and size vary according to the variety.

The olive tree is by no means free from pests. There is a scale insect which is very troublesome and difficult to get rid of, to be found on the young shoots and leaves. It is the same or very like the coccus on orange trees. The best cure is to dissolve 1 bush. of lime and 10 lbs. or 12 lbs. of ordinary washing soda in 100 galls. of water, and spray the trees inside and out. The curculio beetle is also very destructive; it eats the young shoots and leaves at night, and lives under the clods of earth during the day. Fowls are very good to keep them down, scratching round the stumps for them.

It would be very difficult to estimate the yield of an olive tree at a given age. Much depends of the variety, season, and care in its culture. I could show an acre of trees which had over 3 tons of fruit one season; the same trees bore not more than half a ton the following season, or an average of 42 lbs. per tree for the two years.

The fruit should be hand-picked, for the old custom of knocking it off the trees with rods injures the trees. Shaking the trees is also resorted to as a means of obtaining the fruit; but, though not so injurious as the beating, I cannot recommend it.

THE VINEYARD.

SEASONABLE NOTES.

BY ARTHUR J PERKINS, GOVERNMENT VITICULTURIST.

The practice of manuring plants usually implies placing within reach of the roots, and in an available form, such substances as vegetable physiology has shown to make part of their general requirements. With the general phenomena that characterise the processes of absorption and assimilation of plants we are all more or less familiar. It will generally be unnecessary to point out that the roots take up from the soil more or less simple mineral compounds, and that the latter become subsequently elaborated in the leaves into those complex organic substances of which the tissues of plants are composed. It is sufficient to note here that, if we except parasites and saprophytes, in no case do plants borrow their organic matter, but manufacture and build it up *de toutes pieces*, as the French would say, from the simple mineral salts of the soil, from water, the gases of the atmosphere, and the vivifying sunlight. It has become to be looked upon almost as an aphorism that just as the leaves are the seat of assimilation and digestion so to the roots alone is exclusively reserved the function of absorbing the elementary raw material in the soil. True, under certain conditions the shoots, the leaves, the fruit even, may take up moisture directly from the atmosphere. Possibly, also, though to a minor degree, in some specially limited cases more substantial fertilising matter in gaseous form, such as ammonia, or even free nitrogen, may find its way into the plants by other than the orthodox channels; nevertheless, both in the popular and the scientific mind, the roots still practically retain undisputed the title of sole purveyors of elementary mineral food. This mineral food that we find scattered indiscriminately throughout the bulkier

and less valuable portions of the soil, often temporarily locked up and imprisoned in stable and resistant compounds, it is sought, in the practice of manuring, to supplement in a more or less concentrated and available form. Some manure, it is true, such as farmyard manure, bonedust, &c., present these fertilising elements mainly in the form of organic compounds; but the latter we know remain useless to the plants until, through the agency of the soil bacteria, they revert to simpler mineral form; hence, when such agency fails the apparent sterility of certain soils, such as marshy peats, &c. It was but natural that from such facts should spring the universal practice of placing these elementary fertilising matters exclusively at the disposal of the roots, and such undoubtedly in the case of most plants will the practice ever remain. In spite, however, of their great development and the keen struggle for existence that obtains between neighboring plants, the roots cannot be expected to occupy every inch of the soil in which they happen to be placed; much, therefore, of the fertilising substances introduced must be lost to them. In order to prove immediately effective they are introduced in an available or soluble form; if not absorbed within reasonable time they may be lost in the depths of the subsoil, or even undergo decomposition into gaseous form, as is the case with nitrates, and find their way back into the atmosphere, whence the necessity of supplying plants with considerably more fertilising substances than they could actually utilise were there no losses whatsoever. If now, by some process or other, it could be found possible to ensure the complete absorption by the plants of all the fertilising substances applied, and if the losses could be reduced to a negligible figure, the actual cost of manuring might be considerably reduced. Some few years back it was found in the south of France that chlorosis, the bugbear of growers of American vines in soils of limestone formation, could easily be checked by painting over the scars and wounds of the recently-pruned plants with a concentrated solution of ferrous sulphate. This treatment must be given early and before the plants definitely enter the dormant stage. It would appear that during the wet winter months, through their exposed and scarred surfaces, the plants absorb considerable quantities of water, transfusing the iron salt throughout their tissues and neutralising the excess of lime that the ensuing spring always brings in its wake. The undeniable success of this practice has latterly given rise to interesting developments in another field—the application of manures to vines; if plants can be made to absorb ferrous sulphate through scars and wounds why not also concentrated solutions of fertilising elements? And by such means would it not be possible to considerably reduce the cost of manuring vines? Such are the problems with which during the last few years Monsieur Galen has been battling in the south of France, and latterly he claims to have found for them a most satisfactory solution. The scars and wounds of the recently-pruned vines, but more particularly the extremities of the spurs, that had previously been hollowed out in the shape of a little cup, are painted over with a concentrated solution of fertilising salts made up as follows:—130 grams of potassium dihydrogen phosphate and 450 grams of ammonium nitrate are dissolved in one litre of water, giving a liquid containing about 157 grams of nitrogen per litre, 53 grams of phosphoric acid, 70 grams of potassium oxide. The exact time of the year when the solutions are applied would appear to form an important factor in the success of the treatment. Late treatments apparently remain without appreciable results. In order to reap some measure of success it is necessary that the solutions be painted over late in autumn, the vines having been pruned before the complete fall of the leaves, i.e., some time in May. During the present season extensive experiments on the lines above described are being carried out in many French vineyards. From results that have hitherto been published it may for the

present be gathered that the new practice has everywhere resulted in considerably stimulating the early vegetation of the plants. The latter have burst into leaf from three to four weeks earlier than vines treated in the ordinary way, and show a far stronger and healthier growth; the flowers also appear to have set earlier. Of its relative action on the abundance of the yield nothing can be said until later on in the season. It may, however, be noted here that by an irony of fate this would-be beneficial treatment has, in the present season at all events, probably done more harm than good to the French vineyards. The abnormally early vegetation to which it gave rise fell an easy prey to spring frosts, so common in the south of Europe, and in consequence its value in actual practice has been questioned even by its warmest supporters. With us late frosts are comparatively unusual, at all events over the greater part of our vineyard area; it seems to me, therefore, that if this new practice can be definitely proved to result in any appreciable pecuniary gain, it might in some cases be adopted by us with advantage, and in consequence I have arranged to test it carefully in the College vineyard this season. I shall keep readers of the *Journal* informed of results as occasion arises.

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May and April were comparatively dry, but no one can complain of lack of moisture in June; and where good and early cultivation is resorted to the last month should have laid down a good solid foundation of resistance to the summer drought. During the last few weeks I have had occasion to run over some of our vineyards, and the tardy, bad, shallow tillage that in most places is being doled out to them augurs badly for the incoming vintage. Needless to point out that under the influence of the extended drought in most places the vines have made but poor growth, and it is only good winter cultivation and a liberal application of manures that can rapidly restore them to their original vigor. How many are there who are making the best of the rapidly passing winter months?

WINE AND CELLAR NOTES.

By ARTHUR J. PERKINS, GOVERNMENT VITICULTURIST.

It has occurred to me that by opening a monthly column on wine and cellar matters the pages of this journal might, in the eyes of those whose interests are bound up with this special side of agriculture, acquire additional interest. I intend therefore, under the heading of "Wine and Cellar Notes," introducing some hints on the management and treatment of wines as the time of the year and passing events may appear to suggest, and at the same time discussions on topics that are in any way likely to affect the well-being or success of this important industry. And as I shall spare no trouble in working the matter up I trust that this new departure may prove acceptable to all those whom it will more especially concern.

The disposal of our wines on the London market is a matter of vital importance to the industry, and I may therefore be excused for introducing a few remarks on the subject in this, my opening article. The Government depôt was born in stormy seasons; but slowly, yet surely, it has fought its way up, and to-day even its bitterest opponents cannot deny that both directly or indirectly it has opened out a new era for the trade. It is undeniable, however, that even to-day it is far from receiving the patronage that it might be expected to do; and after all, the larger quantity of wine it may have to handle the more will its zone of usefulness expand. There are at present many obstacles that are impeding its natural growth. To these, however, I intend making no

reference to-day, excepting in the case of the relative profits realised by the shipper through the agency of the depôt on the one hand, and by the wine-maker who sells his wines direct to London firms, f.o.b., Port Adelaide. I take it that there are persons who are shy of availing themselves of the advantages offered by the depôt on account of the element of uncertainty that is introduced by sales at some considerable distance from their cellar doors. Further, in many cases undoubtedly ready money is a matter of great consideration to the shipper, who, under the circumstances, rather than wait for the higher profits realised on deferred sales, takes what he can get from the local buyer. This difficulty is of undeniable importance, and has been readily recognised by the State in the liberal advances made on wines shipped through its medium. It may be stated without exaggeration that in many cases partial advances have been made equal to any net prices that could have been obtained from local buyers. It must be recognised, therefore, that the ready cash objection cannot be raised against shipments through the depôt. Others, again, whilst willing to await the results of the sales, have been unable or unwilling to advance the costs of freight and insurance; this difficulty has also been overcome, and the State makes all advances for shipping and other expenses, holding it as a debt pending the sale of the wine. And, finally, some, in their ignorance of such transactions, have been afraid of the charges and expenses that might accumulate in London against a wine awaiting sale. Such charges are naturally liable to vary according to the time the wine may lie under offer, and the special treatment its condition on arrival may render necessary. In order to introduce some element of certainty in the matter, and to reassure the timid, I propose from time to time giving brief summaries of expenses incurred by typical wines; the results, I feel certain, will convince all of the great advantages of availing themselves of the State institution.

The shipment that we will consider to-day comprised 120hhds., or 6,880galls., of a common, rather full-bodied dry red wine, reaching London on the 24th of November, 1897. It was sold in three different parcels at approximately the following periods:—First lot, in December, 1897; second lot, in February, 1898; third lot, in April, 1898. The total amount of charges for storage, treatment, sale, &c., incurred in London amounted to £50 19s. 2d., or about 1½d. per gallon; for freight, insurance, Port Adelaide expenses, &c., about £149 17s. 10d. were incurred, or about 5½d. per gallon; the value of the casks may be represented at 4½d. per gallon, and carriage to Port Adelaide at about 1½d. per gallon (this last figure will, of course, vary with the distance of the cellars of the shipper from the Port). The total expenditure involved may be scheduled as follows:—

	s.	d.	
London charges	0	1½	per gallon.
Freight and Port Adelaide charges, &c. 0	0	5½	"
Value of casks	0	4½	"
Carriage to Port Adelaide	0	1½	"

Total expenses 1 0½ per gallon shipped.

The wine in question is by no means up to the standard of quality of our better wines, and yet it realised in London about 2s. 9d. to 2s. 10d. per gallon, leaving at the cellar door a net return of from 1s. 9d. to 1s. 10d. per gallon. Let those who are selling their wines f.o.b. Port Adelaide ponder over these figures, bearing in mind that the wine here referred to is below the average of our good table wines. And let me ask them of what advantage is it to them to get f.o.b. prices if, as I understand, the price is always subject to modification should the wine reach London in condition that the consignee considers unsatisfactory? I must say that in no other commercial transactions have I ever heard of such a one-sided bargain. The purchaser, or his accredited

agent, sees the article he desires. handles it, tastes it, takes delivery of it: pays, as is natural, a price that still leaves him a margin of profit should occasional deterioration arise on the journey; but—and this is decidedly unnatural—repudiates all responsibility, for which he has always received price, until the wine reaches destination, when at a safe distance he is sole and unquestioned arbiter in a matter of considerable delicacy. No intrinsic objections can be raised to the sale of our wines *in situ*, but surely business might be conducted on less anomalous and unfair lines.

By the month of July much of the heavy cellar work will have been brought to a close. The new wines should all have received their first racking, and should, until the end of August, be left at rest to deposit much of the finer particles still in suspension and the excess of cream of tartar under the influence of the prevailing low temperature. Older wines, on the other hand, can be manipulated with greater safety during the winter months than in spring or in summer. Blend, bottle, or generally handle them whilst the temperature continues low, and more particularly may this be said in respect to fining. Finings that under less favorable circumstances take a considerable time to deposit act well and rapidly during the winter months. The wine is then generally at complete repose, free from the vital action of ferments of any kind; and, further, the precipitation of the coagulated gelatinous or albuminous matter is more complete under the influence of relatively low temperature. I would, therefore, strongly advise fining all such wines as require it before the advent of the spring months.

In most cellars wood tubs that have to lie about in idleness for a considerable time of the year are a source of annoyance and trouble; if kept empty the wood shrinks and buckles, and they become more or less disfigured and useless; if kept full of water, unless the object of considerable care and attention, they go mouldy and become a source of danger to the wine. Mr. B. Seppelt, the well-known winemaker of Seppeltsfield, has for some time past adopted a device that completely solves the difficulty; and as it is quite possible that it may not be known to all, I take the opportunity of briefly describing it. The tubs are first allowed to dry well, and are subsequently painted over with melted paraffine wax; the latter is then burnt in with a plumber's lamp, starting from the lower part of the vertical walls. The paraffine saturates the pores of the wood, and at all times keeps the tubs in good serviceable condition.

MANURING FOR ROOT CROPS.—In the course of a paper read before the Bedfordshire Chamber of Agriculture the other day, passing reference was made to the experiments being carried out by the Norfolk Chamber of Agriculture on the manuring for roots. Mr. Wood gives the following particulars:—On an acre receiving no manure 12 tons 8cwts. of swedes were grown; on an acre manured with superphosphate, 16 tons 6cwts.; on an acre manured with basic slag, 14 tons 19cwts.; on an acre manured with manufactured bone, 15 tons 18cwts. A little sulphate of ammonia was found to considerably improve the effects of the superphosphate. No advantage, on the other hand, was obtained by using either raw or dissolved bone or guano, and it is now regarded as doubtful whether the use of dung and artificials mixed is economical. As regards manure for mangolds, it must, as a rule, be complete, supplying nitrogen and phosphates; and, indeed, in many cases, manuring mangolds with potash and soda in the form of salt has been found profitable.

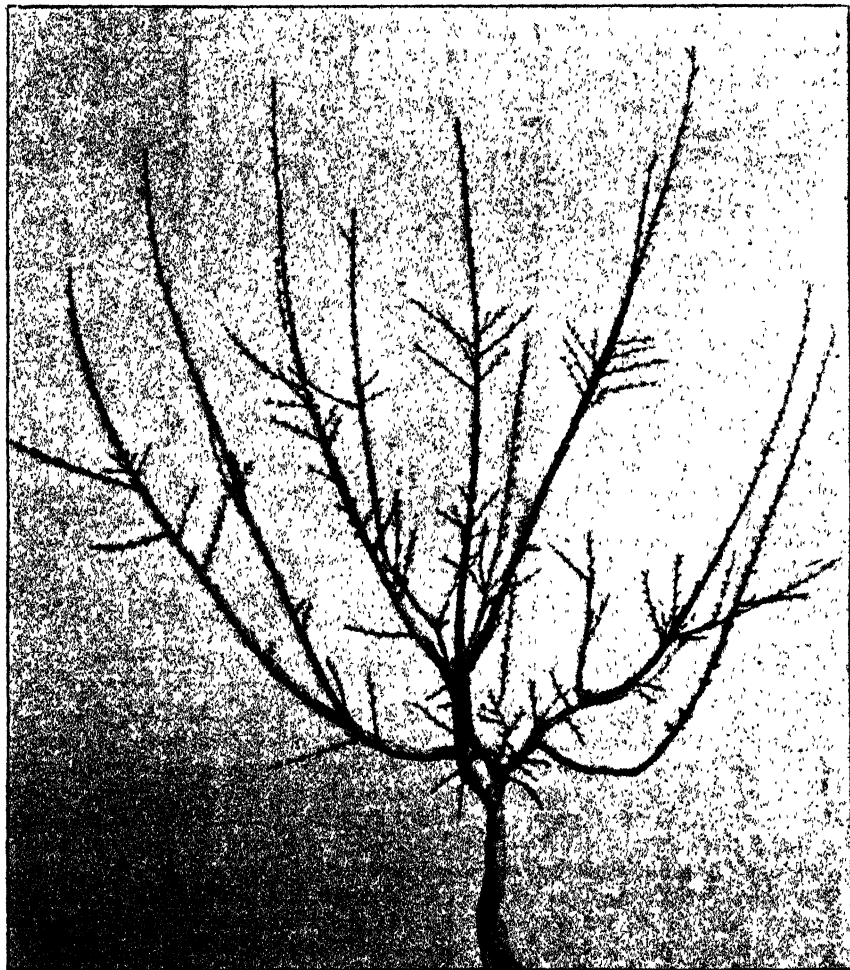
FRUIT TREE PRUNING.—No. 4.

By GEORGE QUINN, INSPECTOR OF FRUIT.

The Apricot.

An apricot tree nearly 6ft. high is shown in Plate XIX. Its training is based upon the plan advocated herein.

In December, 1895, I budded the seedling stem opposite to the small black spot shown in front, just below the first main arm. This black spot is the



XIX.—THREE-YEAR-OLD APRICOT TREE BEFORE PRUNING.

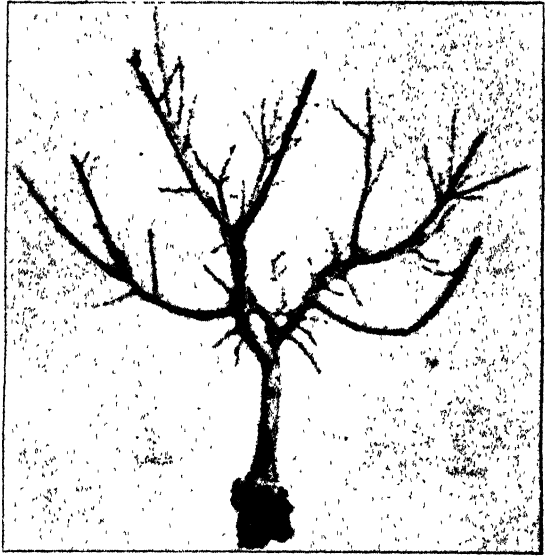
now almost healed wound made by severing the stock after the bud had started. Strong growth arose from this bud during the summer of 1895-6, and in the winter (June, 1896) the shoot was cut off about 16in. from the ground.

Three shoots were encouraged, and they made good progress during the growing season of 1896-7. In June, 1897, these were pruned back to short lengths, indicated by the first sub-division of the main arms.

In the spring of 1897 good growth ensued, and when the leading shoots had grown to about 2ft. in length they were cut back to where the second sub-division of the main shoots is seen. The second growth began almost immediately, and the summer of 1898 produced the final growths of the tree. It will thus be noted that in shaping a vigorous tree a season may be gained by judicious summer manipulations.

This tree is practically framed, though only representing three seasons' growth from the bud.

In June, 1898, the photograph was taken from which Plate XIX. was drawn. The tree was pruned and again photographed without moving the camera. Plate XX. is made from the second exposure. This tree presents many of the points and difficulties found in pruning the apricot. The growths may be classed in two sections—firstly, the main and sub-main shoots; secondly, the straight stiff side growths emerging from these, which are commonly called "spurs." In our illustration the latter may be found upon all growths above the main stem. This is as it should be, but upon the final sub-divisions of the main shoots they are by no means consistently located. All those of any consequence are seen about midway along these last-named shoots. Herein lies a difficulty to the beginner. He has probably observed that upon spurs the best apricots are borne, and argues that the more of these fruit-bearing growths



XX.—THREE-YEAR-OLD APRICOT TREE
PRUNED.

he preserves the more fruits will be produced; consequently he is tempted to sever the leading shoots above these clusters of spurs. This would result in a greater profusion of blooms, and probably an increase in the number of fruits produced in the ensuing year; but a great disadvantage would be encountered owing to the buds remaining dormant upon the couple of feet of shoot situated immediately below these rosettes of spurs.

The bloom buds formed upon these clustering spurs, which are produced on the upper parts of an annual shoot, are very unreliable, and the spurs themselves frequently perish during the following summer.

Plate XX. shows how these leading shoots should be pruned to obtain the best results. It may be mentioned incidentally that in the summer following this pruning (December, 1898) this tree matured upwards of 4doz. of fine apricots upon its lowest spurs.

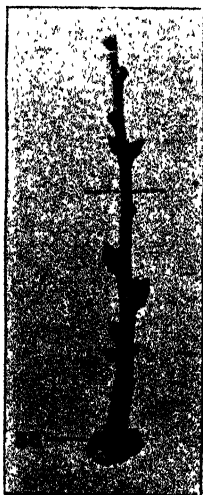
The fruits of the apricot are usually borne upon spurs produced during the previous summer by shoots one or more years older.

In Plate XXI. the growth between 1 and 2 represents wood made in the season 1897-8. The spurs arising therefrom and the leading shoot from 2 upwards were growths of 1898-9. Had this branch been allowed to remain upon the tree, flowers and fruits would have been carried upon these spurs in the spring and summer of 1899. Similar spurs and leading shoots in like order would have arisen from the buds seen upon the leading shoot between 2 and its terminal point. The space between 1 and 2 represents the correct length to be retained upon this leading shoot. The resulting growth shows that the pruner gauged the proper length, for every well-matured wood bud thereon has developed, forming either a leading shoot or a fruiting spur. No arbitrary length can be laid down for rigid observance. The pruner must use his judgment with each shoot; but for the guidance of the beginner it may be said that very rarely during one year can more than one foot be left upon these leading shoots if all the buds upon that space be utilised. By carefully observing this point the fullest use may be made of every inch added to the height of the tree from year to year.



XXI.

Plate XXII. is a typical spur of one season's growth, cut from the branch figured in Plate XXI.; it is about 7in. long. A piece of the bark of the parent branch is retained to show the semicircle of wood buds located at its base at BB. Higher up small scars indicate undeveloped leaf buds. Spread at intervals upon its length are single and double flower buds; these are of a rounded conical shape. Located between these pairs in each instance is a wood bud. This does not always occur, as there are sometimes three bloom buds and no wood bud in such clusters. Just under the transverse line and three spaces from the top single wood buds are seen unattended by bloom buds.



XXII.

A study of the bud formation upon the spurs of the apricot is of the utmost importance to the pruner, as it is highly desirable to retain their vitality and productiveness as long as possible.

If the reader examines the buds upon a lateral spur and those on a vertical leading shoot he will find the arrangement very similar; but a careful inspection of their behavior in the growing season will convince him that for the purposes of pruning they require widely different treatment.

On the leading shoots the flower buds are formed late, and are usually weaker than those on lateral spurs; consequently the pruner may sever the shoots above a cluster of flower and wood buds and secure the desired result, viz., the continuance of good growth thereon, as on these shoots the wood buds absorb most sap and grow strongly and rapidly, to the detriment and early decay of their accompanying flower buds. On the lateral spur the reverse is the case. At the terminal point of the spur a wood bud is almost invariably placed, and if the spur be properly matured in the first year and not pruned in the following winter this wood bud will grow and continue the life of the spur, forming upon its new growth flower and wood buds in numbers governed by the strain put upon it by carrying

fruits, or by want of light, or by too severe a struggle for nourishment with adjoining spurs or shoots.

If the spur be shortened in over a cluster of flower buds between which a growing bud is located there is always, unless the wood bud be exceptionally strong, a great tendency for the spur to die out after carrying fruit in the following season. This must follow as a matter of course, because if the spur has no leaves it ceases—after the fruit passes a certain stage of development



XXIII.—APRICOT TREE WITH LONG STEM.

and loses its leaflike power of assimilation—to draw sufficient sap to keep it alive. The fruit must also suffer while it robs the spur at this late stage. To preserve these spurs and continue their period of usefulness the pruner should in every instance look for either an isolated or a stout wood bud over which to sever each spur when it is considered advisable to shorten any of them back toward the source of sap supply. Unless these spurs are over 6in. in length,

or there is a necessity for reducing their number in any given spot, it will be found advisable to leave them unpruned. A weakly spur an inch or two long is best cut back to within half an inch of its parent shoot; then, if the top of such a shoot has been pretty severely pruned, some of the base buds, as shown in XXII., will usually break forth to supply the vacancy. In that illustration the spur is about 7in. long, and the cross line shows where it should be severed over a strong wood bud.

In Plate XXIII. a rather superior specimen of the ordinary type of apricot tree found in our orchards is shown.

This tree has a stem nearly 4ft. high, and the main arms are numerous and tend to a horizontal position. The stem and main arms have been lengthened too rapidly, and consequently much bare space is seen upon them. The centre branches are too dense to permit proper development of spur growth, and want of light will rapidly kill off those at present in existence.

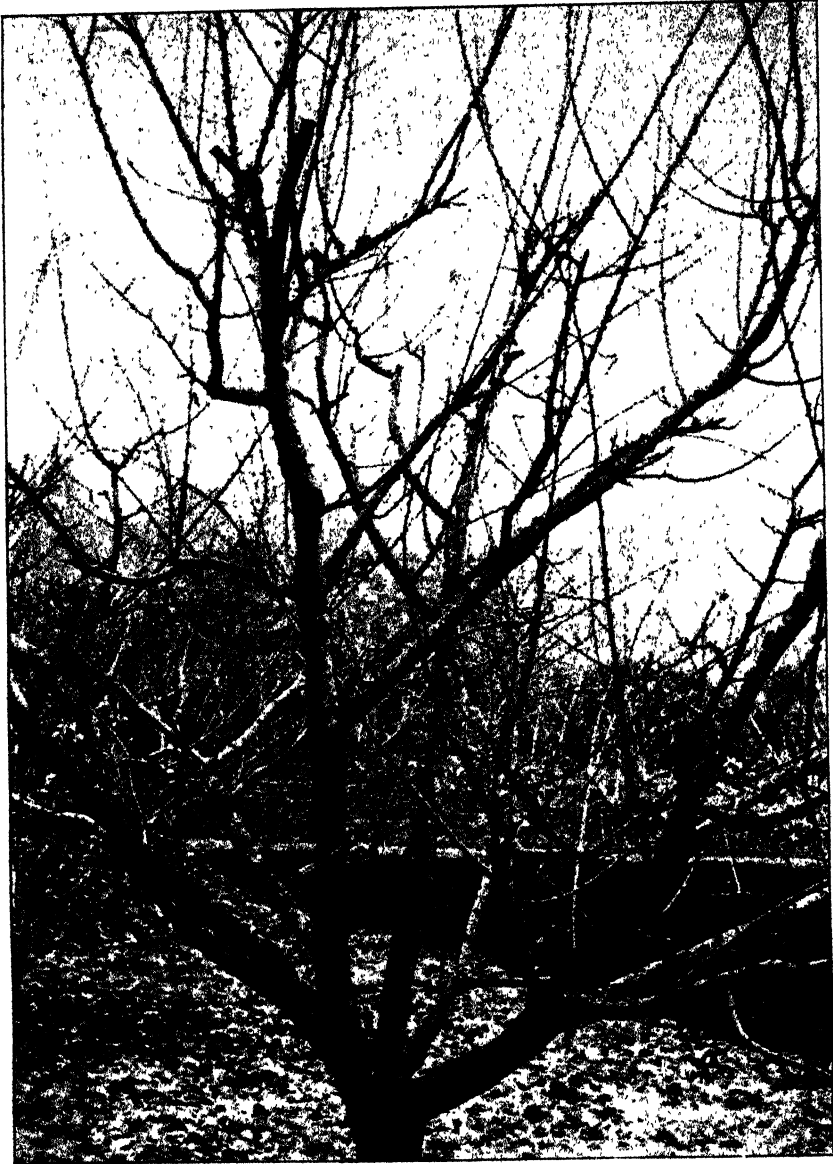


XXIV.—EIGHT-YEAR-OLD APRICOT TREE WELL FORMED.

This tree will produce a very large quantity of fruit during the first few years of its existence, and will tend to rapidly raise its fruit-bearing wood to a height out of reach of the harvester when standing upon the ground.

The fruits will, each succeeding year, be subjected to greater risks of injury from winds, hailstorms, and sun scalds. A glance at the rigid oblique arms of the tree shown in Plate XXIV. will illustrate the fallacy of the argument that cultivating implements can pass closer to the tree with a long stem and arms that tend to a horizontal or pendulous position.

Plate XXIV. represents an apricot tree trained on later models. It has been well shaped and regularly pruned upon a definite system. It is now rising 8 years old, and still carries good fruit bearing wood down to the main stem. Every succeeding year has added a short length to each leading shoot, and

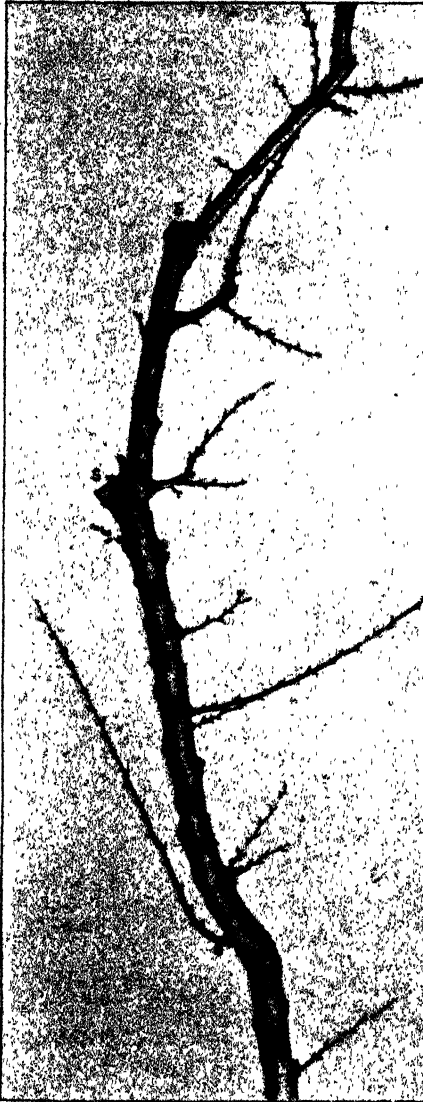


XXV.—OLD APRICOT TREE SHOWING RESULTS OF SHORTENING BACK.

every such length carries its quota of fruiting spurs. The stiffness of its arms enables them to carry heavy crops of fruit without swaying against or reclining upon each other. The fruits may be gathered without mounting ladders.

Pruning is also done from the ground without any tools beyond ordinary two-handed pruning shears, and by the aid of a set over plough cultivation may be carried within a few inches of its 12in. high stem.

In good soils in South Australia the apricot tree lives to a great age, and



XXVI.—HORIZONTAL LIMB REFURNISHED WITH FRUITING WOOD.

the tree illustrated in Plate XXVII. is about 40 years old. Unless these trees are pruned with most scrupulous care there is a tendency for the fruit-bearing wood to die out upon the lower limbs as they attain age. There are two methods of refurnishing these lower limbs with young wood. The most desirable of these is to shorten back the main arms on to wood several years old, as shown in Plate XXVI. For this method to prove successful two conditions are necessary—firstly, the tree must be in good ground and the roots healthy; and, secondly, it is only possible where the top growth is comparatively strong.

In performing this work it is always well to cut the old wood back to where a growth has emerged, as seen at S in Plate XXVI. If this branch is examined closely it can readily be seen that the refurnishing spur growths have emerged from dormant buds located at the bases of dead spurs, the stubs of which still remain. When the pruner remembers—as shown on Plate XXII.—that there are usually six of these base buds supplied to each original spur he can readily understand how successive shoots may arise therefrom when the proper stimulus is applied. The second method is more heroic, and is utilised when the ground is not rich and deep and the tree is not in a thriving condition. This simply consists in stumping the tree back to the primary main arms and re-starting the top afresh. This method only permits the tree to gradually return to a cropping state over a period of several years. It can be made a much greater success by means of spring and summer manipulation, by which the young

shoots are judiciously thinned off at the outset, and, if desired, a good opportunity exists for changing the variety by means of budding. Plate XXV. shows a tree upon which the shortening back method has been practised with fair

success, but the shortening has not been sufficiently consistent upon all arms to produce uniform results. Plate XXVI. is a horizontal limb cut from the tree shown in Plate XXV.

Plate XXVII., as previously remarked, represents an apricot tree nearly 40 years old. It is perfectly healthy and carries good crops of excellent fruits. But the gathering of fruit from apricot trees over 20ft. in height is a problem calculated to disturb the credit balance of the grower under present prices. This tree has been shortened most unsystematically, and yet the results, in the



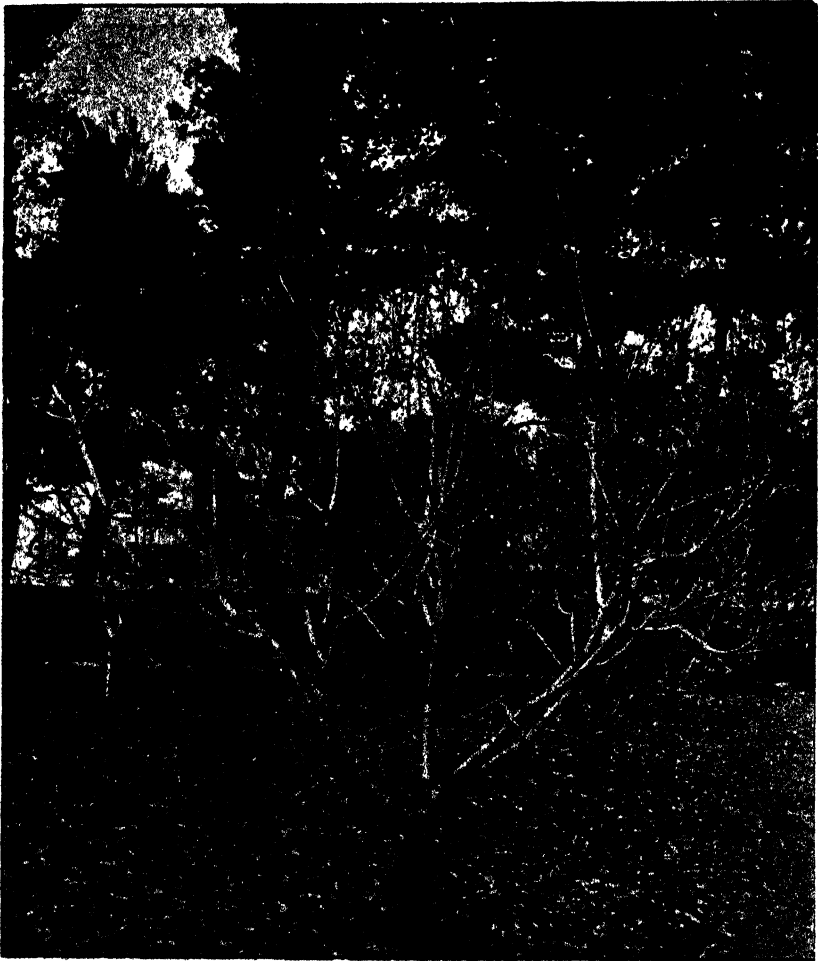
XXVII.—FORTY-YEAR-OLD APRICOT TREE SHORTENED BACK.

direction of refurnishing, are noticeable, more particularly upon one of the bottom limbs which stands in the lower forefront of the picture. By stumping in the outside arms of this tree young growth could be obtained low down; the lofty centre could then be cut out and the tree safely restarted. Notwithstanding this work the grower need not be wholly deprived of fruit any season during its progress.

Respecting the specific treatment to be applied to different varieties of the

apricot, the pruner should note that these illustrations apply directly to the Moorpark section, as the sort more generally grown.

There are certain varieties which mature their fruits earlier, and on these the spurs are less rigid. These spurs do not die out so rapidly, but lengthen and branch naturally. After bearing fruits they take a pendulous habit. The fruit buds, which are usually single, are placed on the terminal half of the spur.



XXVIII.—PEACH TREE AS ORDINARILY GROWN.

These branching spurs should not be cut unless they become much weakened and unfruitful, then they should be shortened in to the first point at which they branch after emerging from the parent shoot. The rules laid down for the pruning of the leading shoots of the Moorpark section apply with equal force to these earlier varieties.

The Peach and Nectarine.

The pruning to be applied to these trees is practically identical. We will therefore deal with the peach as the more commonly grown tree in South Australia. As shown in Plate XI. in an article in June issue, its flower buds

are only borne on shoots made during the previous season; consequently the problem that is set for the pruner is to provide sufficient annual growth for next year's needs while preserving enough flower buds to secure a fair crop of fruit during the present season, *i.e.*, the coming summer. Thus, in pruning this tree, the operator has to exercise a considerable amount of foresight, more especially if he desires to retain fruiting wood on the lower portions of the tree.



XXIX.—WELL-GROWN PEACH TREE ABOUT EIGHT YEARS OLD.

The peach is, without doubt, the most difficult of all deciduous fruit trees to keep in good furnished condition throughout, owing to the ease with which the lower lateral growths may be killed. It may be safely argued that one—if not the chief factor—which operates in the favor of, and causes the upper shoots of any plant to outstrip their companions, is the greater supply of light they receive. The natural habit of growing into a dense bush, which a young peach tree usually assumes, operates very strongly against an adequate supply of sunlight reaching the lower lateral shoots. It is therefore not surprising that in a few

years all of these perish, and the annual fruit-bearing shoots are confined to the terminal points.

In Plate XXVIII. a good specimen of the peach tree as ordinarily grown may be seen. In this instance the centre has been cleaned out after the tree was formed, and the top growths have been permitted to overshadow it to such

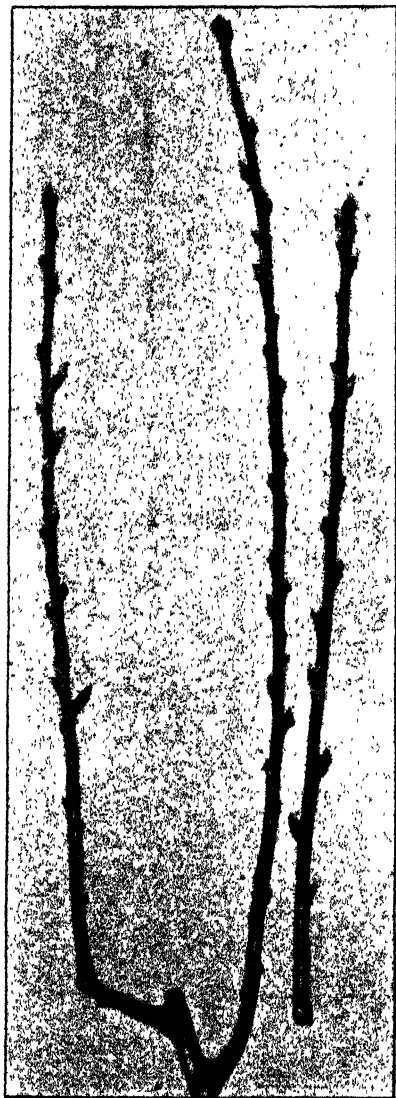
an extent that no fruiting wood grows upon the main arms within 4ft. or 5ft. of the ground, and each yearly addition is raising the fruit still more out of reach of the grower and more into the zone of exposure to high winds, sun scalds, &c. Plate XXIX. shows a well-grown tree somewhat older. This tree has been summer and winter pruned, and, it will readily be noted, is supplied abundantly with annual wood down to the main stem.

A close examination of this tree will show that it is a perfect goblet shape. The centre is hollow, and free access is given to the sun's rays. The main arms have not been sun scalded, because the laterals growing at regular intervals upon them bear leaves, and thus shade the parent stems. These laterals assist in the vegetation of the tree, and of themselves, and are thus less liable to be starved out of existence by their more favorably located fellows above.

To secure trees of this description the leading shoots must be pruned short each year, and great care exercised in cutting the laterals which arise from them. The tendency of the top growths upon the leading shoots to close over the centre must be counteracted. Spring disbud-
ding, as well as summer pruning, must be practised upon the lateral shoots.

For the winter pruning of the main shoots I recommend the beginner to refer to the illustrations of the forming of fruit trees in Plate IX. in May issue. In the winter pruning of lateral shoots care must be taken to cut above wood buds which stand alone, and not trust to the growing buds located between two flower buds, for, as in the case of the apricot, these flower buds on lateral growths rob, and frequently destroy, the wood buds located between them.

Upon leading shoots the reverse is the case, the growing bud maintains its



XXX. FIG. 1. FIG. 2.

supremacy. The pruning to be applied to the laterals of different varieties varies considerably.

In Plate XXX. the positions occupied by the bloom buds are typical of the two sections into which peach trees may be classed for the purpose of pruning

the lateral growths. Fig. 1 is cut from an Early Crawford tree, and is typical of pretty well all of the varieties which ripen their fruits early. It will be noticed that all of the flower buds are located upon the top half of the shoots.

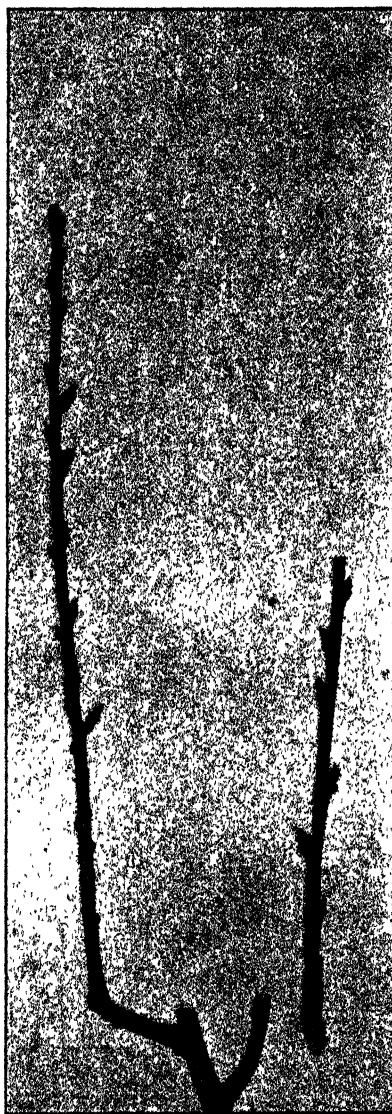
Beneath, to the base, only growing buds are found. The ordinary pruning in vogue which reduces all of the shoots by one-half, would simply cut away all of the bloom buds on shoots of this description. These varieties also have a habit of shedding large numbers of bloom buds during the dormant period, and for this reason many more buds should be left upon them than upon mid and late ripening kinds. Late pruning is also advisable, owing to this bud-shedding characteristic. Fig. 2 is a fair representative shoot of the mid and late season sorts. The bloom buds are carried along the full length of the laterals upon the varieties of this section, and as the bloom buds seem to have a secure hold, the pruner may safely remove from half to two-thirds of the length of each year's growth, and still retain enough buds to produce a good crop.

Plate XXXI. shows how these respective shoots would be pruned. In the case of Fig. 1 it will be noted that the shoot which is placed at a disadvantage respecting a supply of sap is left to bear fruit, after which in the next winter season it would be entirely suppressed. The right-hand shoot has been shortened back to healthy wood buds near its base, and will produce two or more shoots in the coming summer for next year's purposes.

With the section to which Fig. 2 belongs there is rarely much difficulty in securing sufficient annual wood to utilise, but to prevent undue extension a fair proportion of the shoots must be cut back to wood buds to restart growths further back toward the main arms, thus permitting a gradual reduction of the outer shoots which tend to destroy the symmetry of the tree.

When pruning the laterals of the peach, growths like Fig. 1 in Plate XXXII. are frequently met. These are pithy and weakly. They terminate in a rosette

of flower buds, which occasionally expand, but generally fall without setting fruits. The buds from the top to the base are weakly and undeveloped, consequently are unreliable. If these shoots remain they generally die back. If they are cut above the weakly buds a similar result follows. The best plan to



XXXI. FIG. 1. FIG. 2.

adopt is to suppress them back to the parent shoot. At the base of Fig. 1 a base bud may be seen on each side, at BB. If such shoots are cut back, not too closely, these base buds generally start as seen in Fig. 2.



FIG. 1. XXXII. FIG. 2.

The left hand growth from a base bud on Fig. 2 would most likely have carried a peach during the coming summer. Its fellow on the right was shortened in late in summer, and has matured good wood buds at its base. These would doubtless have been utilised to start good strong lateral shoots next growing season. It will be seen that these base buds are on the base of the lateral and not on the parent shoot. It is, therefore, necessary when cutting a peach lateral back to base buds to exercise care and not cut too closely to the old wood. Disbudding in spring is necessary owing to the great number of base buds which grow. If thinned off with thumb and finger while yet brittle the remaining shoots, having room to expand in good light, become much more useful when mature.

Summer pruning in the shape of shortening in the laterals is of advantage and disbudding will be more closely analysed in a later article.

The renovation and refurbishing of old peach trees which have developed a straggling wasteful form is a subject about which a variety of opinions are found. When the trees are growing upon peach roots in good suitable soil, it is often a profitable work, but in poorer soils, more especially if the trees are on almond or other foreign stocks, the work is not "worth the candle."

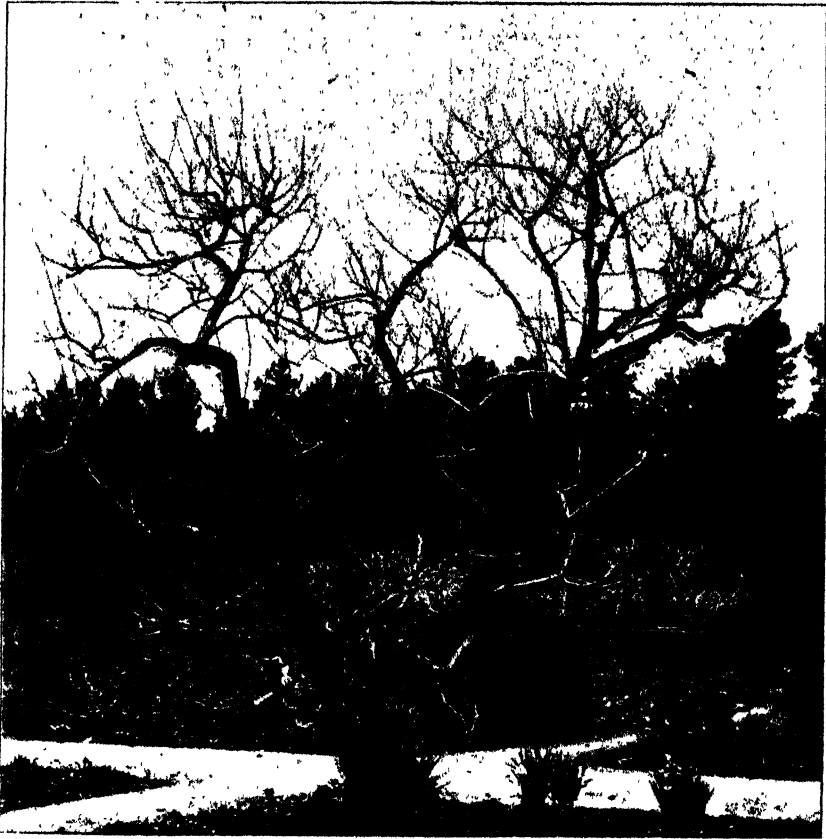
There are two methods of renovation. One is to cut back the main arms gradually, so that its completion is spread over a period of about three winters, and thus, while refurbishing slowly, always retain a certain amount of fruiting wood. In this work it is well to avoid, as far as practicable, cutting the arms back to blank stumps. If possible, cut over some side growth, even though such be very small.

Plate XXXIII. shows a peach tree about forty years old on which this operation is being performed. The outside branches have been operated on, and good growth has resulted. The tree could now be relieved of the remaining high limbs.

The second method is to cut the tree back to a stump, and try to force new growth entirely. This practice usually kills out a proportion of the trees operated upon, but when successful it is more complete than the first named, though it, of course, deprives the grower of fruit entirely for two or three seasons. If desired, it offers a good opportunity to change by budding the tree to a more profitable variety.

The reason why old peach trees do not respond to this renovating treatment so readily as other trees may be found in the fact that at the bases of the shoots a far lesser number of buds are developed. Rarely more than two base buds are found on a peach shoot, and these are often bloom buds. When

stimulated both buds usually break into simultaneous growth, leaving no dormant buds available for later emergencies. Added to this sparsity of bud



XXXIII.

FORTY-YEAR-OLD PEACH TREE PARTIALLY SHORTENED BACK.

formation is the fact that the dormant buds remaining undeveloped during the earlier period of growth of the tree, do not display the same tenacity of existence which is found in the members of the plum or pear families.

ORCHARD NOTES FOR JULY.

BY GEORGE QUINN, INSPECTOR OF FRUIT.

All well-cultivated orchards should have been ploughed throughout before this. If this has not been done, the surface soil will now be so sloppy that—in most places at any rate—horses cannot be taken on to the ground.

No doubt many trees are yet to be planted, but in my mind there is no time like very early winter for this work in connection with deciduous kinds. The early planter also has the choice of stock, and the last served often gets old hard-stumped trees of a very doubtful value.

The pruning of deciduous trees will still be in full swing, and the work should be done with great care.

While pruning, suitable pieces of last season's growths should be retained from any sorts deemed worthy of propagation by grafting.

These should be carefully tied in bundles and labelled prior to being buried in moist—not wet—soil in a sheltered position. They are thus preserved until the sap in the trees to be used as stocks begins to rise, and the time for grafting arrives.

Any trees which have been budded during the past summer should be cut back immediately over the dormant "buds." This period of the year, when the bark is saturated, should be taken advantage of to clean away loose scaling bark, which forms a suitable shelter for hibernating larvae of codlin moth. This refuse should be caught and burnt if scraped from trees known to be infested with this pest. I would advise growers to withhold the spraying with Bordeaux mixture for the suppression of fungoid pests until next month, when the buds are loosened and unfolding.

The harvesting of citrus fruits is still proceeding, and it is to be hoped some of our growers will try curing and storing some of their lemons until the season of scarcity arrives.

The first working of apple roots may begin during this month. This consists in grafting pieces of blight-proof roots and shoots together for planting into nursery rows as described in the *Journal of Agriculture*, September, 1898.

NOTES ON VEGETABLE-GROWING FOR JULY.

By GEORGE QUINN.

Sowings should be made in drills of carrots, parsnips, and beets. These all like deep, loose, rich, well drained soils. It is a good plan to make flat-bottomed drills, about 6in. to 8in. wide and from 1in. to 2in. deep. After the seeds are sown evenly along this they should be covered with some finely broken manure which is well decomposed. A compost of two parts manure to one part sandy soil makes a good covering for seeds during the winter season. The planting out of cabbage, cauliflower, broccoli, and onions will still be continued, even on the plains.

Sowings of peas and broad beans should also be made. This is a good time to make the main sowings of the former.

The thinning of former sowings of turnips, carrots, parsnips, and spinach should not be neglected. The amateur usually neglects this necessary precaution, and when all tops and no useful roots are the inevitable result, he breaks out into violent suggestions respecting laws to regulate the sale of seeds.

The preparation of land for the planting of rhubarb and asparagus should be undertaken. The soil for these crops should be trenched about 2ft. deep, and about half a one-horse drayload of good stable manure, or from $\frac{1}{2}$ cwt. to 1 cwt. of bonedust should be worked into the lower foot of loosened soil during the process of trenching. The surface soil should be always retained on top. In good ground rhubarb plants should stand about 4ft. x 4ft. apart, and asparagus plants 2ft. 6in. x 1ft. 3in. In planting these the roots should be spread out carefully and given an oblique downward tendency.

Old beds of these plants should be topdressed with about 3in. of well-rotted stable manure, or a combination of this and bonedust; potash is also valuable. For asparagus a dressing of common salt could be mixed with the manure. The beds should be dug over with a fork very carefully, avoiding undue mutilation of the roots or crowns.

On the plains, where late frosts are infrequent, potatoes should be planted. The soil should be rich and free, and the sets started at the eyes before planting. It is a good plan to just cover the sets with a thin layer of soil, and on this sprinkle a good dressing of bonedust prior to covering the trench in finally.

Make ordinary sowings of cresses, radish, and lettuce for salad purposes. Transplant herbs such as thyme, sage, mint, &c.

Those intending to grow early tomatoes and cucumbers should make a start towards the end of this month by making sowings in heated frames. A simple hot frame is made by putting several loads of fresh stable manure in a heap and turning it once or twice prior to stamping it down to a firm even surface. The frame is then placed on top of it, and more fresh manure piled and stamped around the outside. From 4in. to 6in. of good compost is then placed on the manure within the frame, if the seeds are to be sown loosely; but if small pots are to be used the compost will be put into those, and the pots in turn plunged into the compost until their lower portions are well set upon the manure below. Great care is required in watering young plants raised in these frames, as they at first are so sappy and weakly that an excess of damp cold air will cause them to be attacked by rot fungus and destroyed immediately. It may be necessary to renew the manure around the sides to maintain warmth. Either calico or glass lights may be used with equal success as coverings if they are managed properly, and without this neither are satisfactory.

LEMON-CURING.

At a meeting of the California University Farmers' Institute Mr. A. S. Gaylord, a large grower of lemons, read a paper on this subject, from which we extract the following :—

Storehouse.—The first requisite for successful keeping of lemons is a suitable storehouse. Such a storehouse must have perfect ventilation and a low even temperature.

Practical Operation in Lemon-Curing.—You can readily understand that no one method of handling the fruit in storage can be followed in all lemon houses, the difference in systems of ventilation, &c., making great differences necessary in the methods followed. After some little experimenting the following methods seemed to produce the best results in my house :— When the fruit is taken into the lemon house for storage the boxes are so piled as to allow a free circulation of air around the fruit. If the lemons are in cleated boxes they are piled in tiers lengthwise, the ends of the boxes touching, but leaving a space of 3in. between each tier. If the fruit is in boxes without cleats, they are piled one above another at right angles. Several thicknesses of newspaper are placed over the fruit in the top boxes, as otherwise it would get too much air and become soft before the balance of the fruit was ready to store permanently. The object in piling the fruit in this manner is to allow the moisture in the rind to evaporate; and the boxes are left so piled as long as possible without allowing the fruit to soften, as the less moisture there is in the rind when the fruit is stored the less danger there is of decay. The fruit should not be allowed to get soft before storing permanently; but yet it should lose the hard feeling it has when just picked. I know of no better term to apply to the feeling of a lemon ready to store than that of smoothness. The time it takes the fruit to reach this stage cannot be stated in days, as the condition of the atmosphere and the amount of ventilation given the fruit will hasten or retard the process.

Going into Permanent Storage.—When the fruit is ready to be permanently stored it is looked over, so that any lemons that have decayed can be removed.

It is then put into boxes without cleats. The fruit that is sound, but of low grade, is put into boxes by itself, and kept separate from the prime fruit, as decay is more likely to appear in it. The large fruit is sorted out and put into the top boxes, as the shrinkage is greatest in them, and these are covered by ten or twelve thicknesses of newspaper. Two thicknesses of newspaper are placed both in the bottom of the box and on top of the fruit. Good results are also obtained by placing a single thickness of paper between each layer of lemons. The boxes are then piled in tiers, leaving a space between the tiers for the circulation of air. The air carries off the carbonic acid thrown off by the lemons, and yet does not get to the fruit to dry it up.

Storing in Open Piles.—I have found that when fruit is stored in large blocks there is danger of decay in the centre of these blocks, and that if the centre is given sufficient air that in the outer boxes will get too much. Also, to get at decaying fruit in such a pile the outside boxes all have to be moved. For these reasons the fruit is being piled this year in double tiers across the building, with an alleyway between the double tiers wide enough so that a box can be easily handled. The boxes are piled with the ends toward the alleyway. Decaying fruit can easily be detected by the odor, and the boxes containing any can be gone through without disturbing the remainder. This is of importance, as the less the fruit is handled the better. The advantage of several inner rooms is apparent at this time, as the fruit of one room can be gone over without opening up the whole house. It also allows of the special treatment of the fruit of any one room.

Ventilation.—In the lemon house described the following method of regulating the ventilation has furnished good results:—All doors and ventilators are left open at night, and during the day when cloudy or rainy; on warm days the doors are closed, but all the ventilators are left open. Both are closed during a north wind. All ventilators are closed in summer when the thermometer goes above 95°. On very hot nights, when the temperature is lower in the lemon house than outside, it is found advisable to open only the ventilators; but if this has to be done for more than one night at a time it is found necessary to open all doors for an hour before sunrise.

Advantage of Storing.—Although we yet have much to learn as to the best methods to pursue in lemon storing, we have gone far enough to demonstrate that it is the best course for us to follow. As soon as the bulk of the fruit was kept for summer consumption the winter market improved, and the grower found that, while a large amount of fruit could not be sold in the winter at any price, a small portion could be marketed with profit. As to the future, the prospects for the lemon are very bright, and when some of the lesser details of their keeping have been solved the lemon will be one of the most profitable crops to raise.

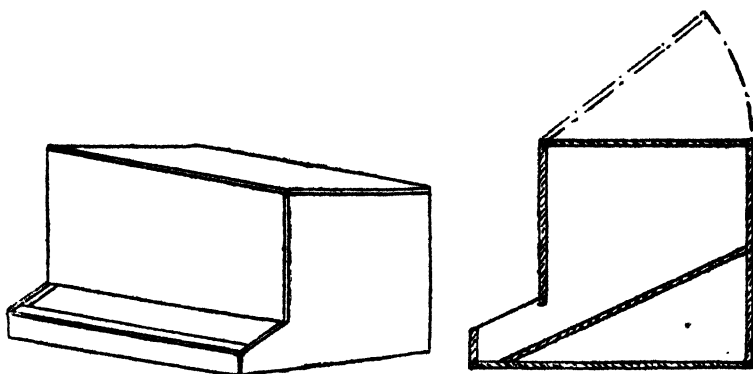
Length of Storage.—Fruit picked in November and December [June-July in Australia] can be held in good condition until August, and probably could be kept until September. It is not usually desirable to hold fruit after August [March in this part of the world], as the market generally starts to decline at that time. The spring pick of lemons does not keep as well as the fall and winter pick, and will usually have to be marketed first.

Picking Lemons.—Great care should be used in the picking of lemons for storage, as a bruise on the rind means decay. A picking bag on the lines of the Woodward bag should be used, the fruit being emptied from the bag into the box slowly, and the box levelled full by hand. If the fruit is not to be looked over before storing away permanently, a double thickness of newspaper should be placed in the bottom of each box, and care taken that no culls or fruit liable to spoil gets in. As to size, always use a ring, unless able to gauge accurately with the fingers. Pick November and December fruit [June-July in Australia] up to the first heavy frost, on a ring 2½ in. in diameter. This

fruit keeps better than any other picking, and it is desirable to get as much off the trees as possible before a frost. Pick as often as you can get a good picking. If left more than thirty days some of the fruit will be too large. Afterwards use a ring 2½ in. in diameter. It is not desirable to let the lemons get over 2½ in. in size.

SELF-FEEDING BOX FOR CONDITION POWDER.

Some of the more advanced pig-breeders regularly supply their hogs with condition powder. This is made with, say, 6 bush. pulverised charcoal placed in a shallow box or on a floor; add 1½ bush. of hardwood ashes, and 6 lbs. salt. Mix this thoroughly. Dissolve 1½ lbs. copperas (sulphate of iron) in 3 galls. hot water; sprinkle this on the above through a watering pot, stirring and mixing the whole while slowly sprinkling. Then place the whole, or a good portion, in a self-feeding box, made thus:—



The box should have a hinged lid, and must be fixed firmly on the ground by driving in strong stakes, else the pigs will turn it over. At the mouth, inside, there should be a slanting board to throw the contents right down to the edge of the little trough, as shown in the front part of the box.

HOUSEHOLD HINTS.

CLEANSING FLUID.—Here is a recipe that should be cut out and pasted in the kitchen, for it will save many pounds' worth of time and strength. Shave five cakes of good hard soap into just enough boiling water to dissolve them nicely. Stir constantly until the soap is dissolved, then add two teaspoonfuls of powdered borax and a scant teacup of kerosine. Stir well, then pour it into a covered stone jar, and use it whenever anything very dirty, either cloth, tinware, woodwork, or iron utensils is to be cleaned. Apply a little to the outside of your kettle while it is hot and see how bright it will be. Use a little also when cleaning your windows, and you will never again regard that task as something to be put off as long as possible. For cleansing skins, wash basins, and slop jars there is nothing equal to it, and by its use the dish towels can be kept nice and white without rubbing. Put them into a pan of cold water, add enough of the compound to form a good suds, and let them come slowly to a boil. Let them boil until they are sufficiently clean, then rinse them and hang them out. Such work will almost do itself while one is attending to other duties, and the task of keeping clean is thus robbed of more than one-half its terrors.—*Farm and Home.*

MONTHLY RAINFALL.

The following table shows the rainfall for June:—

Adelaide	3.02	Riverton	3.00	Callington	1.99
Wilson	3.50	Tarlee	2.39	Langhorne's Bridge..	2.33
Quorn	3.86	Stookport	1.82	Milang	2.25
Port Germein	2.40	Hamley Bridge	2.08	Wallaroo	2.00
Port Pirie	2.19	Kapunda	2.43	Kadina	2.63
Crystal Brook	3.09	Freeling	2.07	Moonta	1.43
Port Broughton	1.66	Stockwell	3.31	Green's Plains	1.92
Hammond	2.67	Nuriootpa	3.67	Maitland	3.41
Bruce	2.79	Angaston	4.32	Ardrossan	1.80
Melrose	4.08	Tanunda	3.64	Port Victoria	2.17
Wirrabara	4.15	Lyadach	4.26	Curramulka	2.90
Appila	4.05	Mallala	2.75	Minlaton	2.61
Laura	3.54	Roseworthy	2.63	Stansbury	1.84
Caltowie	3.27	Gawler	2.88	Warooka	2.78
Jamestown	3.12	Smithfield	1.86	Yorketown	2.94
Gladstone	3.05	Two Wells	2.34	Edithburgh	2.08
Georgetown	3.28	Virginia	2.05	Fowler's Bay	1.02
Narridy	2.86	Salisbury	2.68	Streaky Bay	2.06
Redhill	2.99	Teatree Gully	4.45	Port Elliot	4.06
Koolunga	2.68	Magill	4.19	Port Lincoln	2.92
Carrieton	3.20	Crafers	9.10	Cowell	1.25
Eurelia	3.67	Clarendon	6.70	Queenscliffe	2.33
Black Rock	3.23	Morphett Vale	3.55	Port Elliot	2.31
Petersburg	2.99	Noarlunga	3.03	Goolwa	1.76
Yongala	2.84	Willunga	5.77	Meningie	3.36
Terowie	2.65	Aldinga	4.40	Kingston	4.69
Yarcowie	2.52	Normanville	2.68	Robe	3.80
Hallett	3.44	Yankalilla	2.98	Beachport	4.51
Burra	3.18	Eudunda	2.87	Bordertown	3.44
Snowtown	2.90	Truro	2.98	Wolsley	3.07
Brinkworth	3.24	Mount Pleasant	4.69	Frances	3.47
Blyth	3.24	Blumberg	9.11	Naracoorte	4.53
Clare	4.15	Gumeracha	6.32	Lucindale	4.22
Mintaro Central	3.53	Lobethal	6.17	Ponola	4.62
Watervale	3.89	Woodside	5.77	Millicent	4.86
Auburn	3.06	Hahndorf	5.78	Mount Gambier	4.92
Manoora	2.70	Nairne	5.46	Wellington	3.52
Hoyleton	2.62	Mount Barker	5.85	Murray Bridge	2.60
Balaklava	2.37	Echunga	5.06	Mannum	2.45
Port Wakefield	1.91	Macleodfield	4.88	Morgan	1.95
Saddleworth	2.68	Meadows	6.28	Overland Corner	2.54
Marrabel	2.88	Strathalbyn	2.98	Renmark	2.38

FARM AND DAIRY PRODUCE REPORT.

Messrs. A. W. Sandford & Company report:—

June 30, 1899.

A favorable month's business has been experienced, rains falling where most needed, districts both agricultural and pastoral that lie within our driest areas being well favored. Feed is becoming abundant; the young wheat plant in all directions is having a propitious start, and, with the improved market prospects, farmers are more hopeful of a return to better times. The firmness and further advance in the wool market it is to be hoped will lead soon to the re-occupation of the formerly valuable pastoral runs that are now lying idle, and also prevent the further contemplated abandonment of other old-established squatting properties.

Business is generally satisfactory, both in town and country, the public accounts up to June 30, although not yet complete, showing a balance in the State finances with surpluses from directions that indicate a revival of our leading industries. The output of copper from late developments should soon show a marked increase.

The less favorable weather conditions over some of the more important wheat districts in the Northern Hemisphere caused a hardening in price of the cereal, London values advancing from 3s. to 4s. per quarter, though at moment an easing back of about half the advance gained is reported, with demand, however, continuing fairly brisk for Australian cargoes for early delivery at European ports. The probability of trouble in South Africa has caused merchants there to order breadstuffs in increased quantities from Australia, and this is inducing a considerable transfer of grain from growers' hands, so that stocks in our colony on farmers'

account have been materially reduced during the month. Flour has fluctuated in sympathy with movements in the grain. Bran and pollard are easier, with other forage lines, owing to the more abundant growth of feed. Though the yield of potatoes in the South-Eastern districts was light, and not up to the average this season, and stocks held are smaller than usual, there is no anxiety on the part of dealers to secure lots offering, imported sorts having obtained hold of the market. Good stocks of onions exist, but being well held, local price is kept close on a parity with the cost of landing Victorian samples; that market, as usual at this season, fixing Australian rates.

In dairy products good trade has been doing. Butter continued short of the colony's requirements during the earlier half of June, so that importations were necessary until a few days ago, when supplies increasing rapidly values gave way, and South Australia is again in this line self-supplying, with prospects of having an exportable surplus within a few weeks; meanwhile values are steadily falling. About three weeks ago eggs gave way in price rather unexpectedly, and notwithstanding it was confidently believed by many in the trade that a recovery would occur values continued to run down, although at moment there is a slightly firmer tendency shown; but we must very soon expect the seasonable drop, therefore do not think any marked recovery possible before spring quotations are reached. Well-conditioned cheese is very scarce, so large a proportion of stock now held at the factories being old and dry, but no importation is possible at present prices. There is an excellent turnover in bacon for winter time, owing chiefly to the relatively high prices ruling for butchers' meat; quotations are a shade easier, but there is no probability of the fall usually expected at this time of the year. Honey is selling much better, and values have advanced a little, though this line is still very cheap. Beeswax active. Almonds scarce. Heavy business doing in live and dressed poultry, the more moderate prices now ruling, compared with rates for past couple of years, inducing increased consumption, all suitable table birds experiencing good competition. In carcass meat full catalogues have been submitted, the market readily absorbing all forward with values sustaining.

MARKET QUOTATIONS OF THE DAY.

Wheat.—Farmers' lots at Port Adelaide, 2s. 10d. to 2s. 11d.; outports, 2s. 7d. to 2s. 9d. per bushel of 60lbs.

Flour.—City brands, £7; country, £6 2s. 6d. to £6 10s. per ton of 2,000lbs.

Bran, 8½d.; pollard, 8½d. per bushel of 20lbs.

Oats.—Local Algerian, 1s. 7d. to 1s. 10d.; good stout white, 2s. 4d. to 2s. 9d. per bushel of 40lbs.

Barley.—Malting, nominal; Cape, 2s. 3d. to 2s. 4d. per bushel of 50lbs.

Chaff.—£3 to £3 5s. per ton of 2,240lbs., dumped, f.o.b. Port Adelaide.

Potatoes.—Mount Gambiers, £2 17s. 6d. to £3 2s.; Tasmanian and New Zealand, £3 2s. 6d. to £3 5s. per 2,240lbs.

Onions.—£6 5s. to £6 10s. per 2,240lbs.

Butter.—Creamery and factory prints, 10d. to 1s. ¼d.; dairy and collectors' lines, 8d. to 10d. per pound.

Cheese.—S.A. factory, best, large to loaf, 6d. to 7d.; ordinary to fair 4½d. to 5½d. per pound.

Bacon.—Factory-cured sides, 6½d. to 7d.; farm lots, 5½d. to 6½d. per pound.

Hams.—S.A. factory, scarce, 7d. to 8½d. per pound.

Eggs.—Loose, 9½d.; in casks, f.o.b., 11d. per dozen.

Lard.—In bladders, 5½d.; tins, 4½d. per pound.

Honey.—2½d. for best extracted, in 60lb. tins; beeswax, 1s. per pound.

Almonds.—Soft shells, 4½d.; kernels, 11d. per pound.

Gum.—Best clear wattle, 1½d. per pound.

Carcass Meat.—Vealers, 3d. per pound; handy shop porkers, 4½d. to 5½d.; good baconers, 4d. to 4½d.; heavy, of prime quality, 3½d. to 4½d.

Dressed Poultry.—Turkeys, 6d. to 6½d. per pound; fowls, 4d. to 5½d.

Live Poultry.—Fine table roosters, 1s. 3d. to 1s. 7d. each; ordinary, 1s. to 1s. 3d.; good hens, 1s. 1d. to 1s. 5d.; light and poor birds of mixed sexes, 7d. to 11d.; ducks, 2s. to 2s. 4d.; ducklings, 1s. 6d.; geese, 2s. 3d. to 3s. 6d.; pigeons, 4½d. to 5d.; turkeys, from 4d. per pound live weight for ordinary, up to 6d. for prime table sorts.

WEATHER AND CROP REPORTS.

AMYTON.—Rainfall for June, nearly 3in. The land has had a good soaking, and the crops are coming on splendidly. The rain for the most part was steady, and very little ran off the land. Many farmers are busy fallowing, and operations will soon become general. With fair weather feed will grow rapidly. Rainfall recorded for year, to date, 6½in.

AUDEN VALL.—Wheat that came up with March rains has a tendency to run to head, and, where possible, sheep are being turned on to feed it down. Splendid rains have fallen during the month, and the crops have got a good start. With mild weather, feed will soon be abundant now.

ARTHURTON.—With the exception of a few farmers, who will not finish till some time in July, seeding is about over. The season so far has been very favorable, nice rains and sunshine alternating, and with but few frosty nights. The rain has generally been so steady that not much has run off into the dams. Mice are plentiful this year, and are doing a great deal of harm to the crops by burrowing after the grain. Farmers have had to harrow after the drill to prevent all the grain being taken.

BALAKLAVA.—We have had splendid weather since previous report. Steady soaking rains, but not heavy enough to stop work, have fallen. Under the influence of bright days and showery weather, with the absence of frost, feed is coming on well. Fallowing is being pushed on. Wheat crops are coming up well, especially where drilled and manured. The lambing appears to have been good, and strong healthy lambs are to be seen in the paddocks. Rainfall for June, to 24th, 2.16in.

BOULBROOK SOUTH.—Splendid rains have fallen during the month, 3.27in. being recorded to 21st. The wheat plant is looking well and making good growth. Fallowing is the order of the day. Feed is coming on well, and the lambing has been good.

CARRINGTON.—The weather has been decidedly favorable, and the wheat is coming on nicely. Splendid rains have fallen, scarcely any of which has run off. Feed is coming on well, and stock are in fair condition. Farmers are hopeful of a good harvest.

CRYSTAL BROOK.—This month has been very seasonable. Seeding is finished, and with splendid rains we have had the crops are coming on well. With a few fine days crops and feed will make rapid progress, if not too frosty. Rainfall for June to 24, about 3in.

DAWSON.—Up to end of first week in June quite one-half of the wheat was not above ground, and the crops were patchy. The 1mg looked for change has, however, come, and entirely changed the aspect of affairs. Up to the 22nd nearly 3in. has fallen in steady soaking rain, accompanied by mild weather. Feed being scarce, farmers have in many cases to hand feed their working stock. A start was made with fallowing as soon as rain fell; this work is being done earlier than for many years past.

DOWLINGVILLE.—Seeding is just about finished, the system of drilling in seed and manure together being general. The crops above ground look healthy, and feed is coming on fairly well. Stock in fair condition.

ELBOW HILL (FRANKLIN HARBOR).—Nice growing weather prevails, light showers alternating with sunshine, but a soaking downpour is needed to reach the subsoil. Seeding is finished, and most of the wheat is nicely above ground.

GAWLER RIVER.—Favorable weather experienced this month. Seeding was a little late this season owing to somewhat dry weather in May, but is now finished. Crops look strong and healthy. Feed is growing well and is fairly plentiful, the soil having had a good soaking. Stock are in fair condition. Lambing has been good.

JOHNSBURG.—The wheat is coming up nicely, and the few patches that got the benefit of the March floods look healthy. Feed is backward; stock in fair condition. Fallowing has commenced. With the soaking rains we have had this month, crops and feed will make good progress.

KAPUNDA.—Seeding is finished and crops are looking well. Not much frost experienced.

LUCINDALE.—Nice rains have fallen this month, and a few weeks of fine weather would be acceptable. Some heavy frosts have been experienced, but as feed is well forward not much harm has been done. Lambs are coming on quickly, and if left alone by foxes a good percentage should be marked.

MILLCENT.—The weather has been very seasonable, though two or three frosts have been experienced. Seeding is well advanced, most of it having been put in with the seed and fertiliser drill. Grass is plentiful and stock looking well. It is generally admitted that so far this is the best season for past twenty years.

MURRAY BRIDGE.—The weather has been all that could be desired; rain at frequent intervals with a few warm days in between. About 1.5in. recorded to June 23. Fallowing and manured crops look well, but early dry sown crops are very dirty and grassy, and make but little headway. Grass is making good progress, and stock are in fair condition.

ONETREE HILL.—Favored with intervals of soaking rain and warm bright days, the newly sown wheat is well under way. With few exceptions all the crops have been put in with the drill. Grass is fairly abundant; lambing is nearly over, the percentage being above the average. Rainfall to 20th, 2.20in.

PORT ELLIOT.—The first three weeks of June were dry, and white frosts occurred on two or three occasions but not severe enough to do much harm. Seeding is nearly completed with the exception of peas, of which most farmers have put in a few acres. The seed and fertiliser drill is being used this season. Sparrows are not apparently so plentiful as a few years back, but rabbits are on the increase, though the cats destroy large numbers of young rabbits.

RICHMAN'S CREEK.—Up to the beginning of June the rainfall was light and patchy, and not sufficient to start the crops except in places. A splendid fall of rain has, however, been recorded, and the crops are coming up nicely. Herbage is doing well, and stock are in fair condition.

RIVERTON.—Fine seasonable rains have fallen this month. Rainfall to 24th, 2.98in.

CENTRAL AGRICULTURAL BUREAU.

WEDNESDAY, JUNE 21, 1899.

Present—Messrs. F. E. H. W. Krichauff (Chairman), S. Goode, Thomas Hardy, H. Kelly, J. Miller, T. Price, T. B. Robson, and A. Molineux (Secretary).

Storing Apples.

The CHAIRMAN tabled apples which he had kept for two months in ground peat. They were in splendid condition, and not flavored in any way by the peat, though in direct contact with it. Mr. Hardy said unless the apples kept better in peat than as ordinarily stored, he did not see what they gained from the extra expense for peat. Apples were stored here for several months without any packing whatever. The Chairman said his idea was to prove whether the peat would affect the apples, as, if not, it should prove very suitable for packing apples for export, and doing away with the expense and trouble of wrapping in paper.

Orange Round Scale.

The SECRETARY tabled lemons badly encrusted with red scale. These came from a garden with only a few trees, on the banks of a watercourse, and in close proximity to a large orangery, where they were doing all they could, and with very successful results, to keep the pest in check. Members agreed that the existence of a few trees here and there infested by insects was a constant menace to those growing fruit on a commercial basis.

Parasites of Codlin Moth.

Mr. Robson called attention to statement in Museum report to effect that codlin moth larvæ, with ichneumon parasites, had been forwarded to the entomologist. If this were correct, growers should be very careful about destroying the ichneumon flies. The Secretary said it was well known that the codlin moth larva was attacked by several carnivorous and parasitic insects, but unfortunately these were not in sufficient numbers—probably because themselves parasited by other insects—to make any appreciable reduction in the number of codlin moth caterpillars. As with the aphids and most of the scale insects, the parasites could not be depended upon to keep the pest within bounds.

Export of Grapes.

Mr. Hardy stated that the grapes sent by the s.s. *Omrah* to London from Adelaide fetched satisfactory prices. The White Daira, also known as Almeria, carried best. Dark grapes were not so successful. The grapes were packed in cork dust or jarrah shavings, and, as in past two years, carried equally well with either packing. The cork dust cost 1s. 6d. per case of 35lbs. of grapes, while the jarrah shavings cost nothing.

Extracts and Translations.

The CHAIRMAN tabled the following extracts and translations from Foreign Agronomical Papers:—

301. *Premiums for Forest Planting.*—The Prussian State, so rich in forests, pays premiums to private individuals planting forests. In the district of Stade £151 5s. was paid to thirty-one persons in the year 1897-8. They had planted a total of about 300 acres, and received therefore about 10s. per acre.

302. *Statistics.*—For the province of Hanover the Royal stud at Celle had placed in the year 1898 249 stallions at sixty-six stations. Germany in 1896 exported 1,466cwts. of butter and 4,160cwts. of condensed milk to China.

303. *Potatoes*.—According to experiments made in 1897, on twenty-six farms, the potato "Silesia" was found the best as regards quantity, but not quite safe against disease. "Hero" was in that respect better, and also for cooking, averaging 19 per cent. of starch.

304. *Rolling of the Land*.—From Professor Dr. Wollny's experiments it appears that compressed soil shows a higher temperature than if left loose, and that the surface remains moist for a longer time, if a good rain falls after the rolling, and others follow not too far apart. And this is the case, although the surface evaporates more water. To understand this, it is a fact that the compressed soil can hold more water, as the loose surface allows the rain to sink down deeper into the subsoil. Wollny also found that seeds germinated more evenly in compressed soil. In the loose soil many will die from want of moisture. Unless, however, at a somewhat later period the surface was loosened again by hoeing or harrowing the crops taken from land that was rolled were much less. Land which had received stable dung or green manuring, if not of a heavy and wet character, should be pressed down with a plain roller to allow the quicker decomposition of this material. Spike rollers can be frequently used to advantage on heavy soil, where the harrow left many lumps. They will crush these, but keep the surface still somewhat open.

305. *Asparagus*.—In a paper read before the Royal Horticultural Society, Mr. Geo. Gordon, V.M.H., made the following remarks, believing that asparagus plantations could be rendered more productive and profitable:—"Beds are at present formed without any reference to the seed-bearing propensities of the plants. These differ materially in seed production; some are barren, while others have light or heavy crops of seed, and you can observe that the vigor of the plants is in inverse ratio to the crop of seeds they are bearing. Barren plants produce a forest of stout growths rising to a height of 5ft. or 6ft.; those producing light crops of berries will have more moderate growth, while those heavily seeded will make only spindly heads the following season. It is, therefore, in his opinion, advisable to grow the plants another year before using them in the formation of beds, and eliminate all that show signs of seed-bearing. In a few years asparagus might be so improved as to come into line with the finest produced and exported from the Continent."

306. *Specific effect of the Three Main Plant Foods*.—Nitrogen promotes the development of wood, shoots, and leaves, more than of flowers and fruits. Trees may, if receiving too much of it, show a disinclination to form fruitbuds, and will certainly not bear much fruit before advancing age may prevent the too luxuriant growth of wood and leafage. Vegetables, on the contrary, are much in want of nitrogenous manures to promote rapid growth, and thus supply the desirable tenderness. Our gardeners may employ much stable dung which they may have for the carting away from town, and thus provide nitrogen for their vegetables; but it is hardly doubtful now that artificial manures are still more profitable to use. Sulphate of ammonia, and still more so nitrate of soda, act so quickly that the produce to which they are applied while the plant is growing, and at different stages of growth, will come in much earlier and thus command the best price in the market. Phosphoric acid is of the greatest importance for the reproductive organs of the plants, and fruit trees will not give satisfaction unless there is a sufficient supply within their reach. Of course vegetables and all other plants require phosphoric acid, some more, some less. Leguminosae, while drawing their nitrogen from the air, require a large quantity of phosphoric acid and potash to enable them to do so. Bone and other phosphates and cheap phosphatic guanoes, have been used pretty extensively in the province. Thomas phosphate has so far not everywhere been successful, and many will find only in after years that the money was not thrown away. Wetter seasons will succeed the late dry seasons; it is actually advised to dig it in at the rate of 6lbs. to 8lbs. per square rod when land is trenched. Potash, although one of the elements of plant food, and necessary for obtaining a full crop, we know not much of its particular effect. It is nowhere more required than in soils of a light sandy nature, as these are generally deficient of potash. It seems pretty certain that potash improves the quality of fruits, that they contain more sugar, or at least more juicy.

Branch at Mallala.

The formation of a Branch at Mallala, with the following gentlemen as members, was approved:—Messrs. H. B. Moody, G. Marshman, S. Churches, A. Moody, S. Temby, A. F. Wilson, W. R. Stephenson, G. W. Bischof, F. W. Worden, W. Temby, and M. H. East.

New Members.

The following gentlemen were approved as members of the undermentioned Branches:—Mount Pleasant; Mr. W. Royal; Clarendon, Mr. J. Pelling; Boothby, Mr. R. Carrin; Mylor, Mr. W. J. Narrowway; Cradock, Messrs. P. O'Dea, T. Marsh, W. Symons, and W. H. Haggerty; Pyap, Mr. J. Arnold; Crystal Brook, Mr. G. Scott; Swan Reach, Mr. J. Heming; Watervale, Mr.

H. Scovell; Auburn, Messrs. J. T. Kirkbright, O. C. H. Limbert; Quorn, Mr. J. Rock; Johnsbury, Mr. F. W. Smith; Forster, Mr. C. R. A. Schenacher; Gawler, Mr. J. Barritt; Port Elliot, Mr. J. Nosworthy; Morgan, Mr. H. Hahn; Stockport, Mr. J. F. Godfree; Muntoora, Mr. C. H. Button; Elbow Hill, Mr. Geo. Dunn; Renmark, Mr. Ed. Hutton; Port Germein, Mr. C. O'Loughlin; Port Pirie, Mr. T. Jose; Wilmington, Messrs. R. Cole, M. Gray, J. Hutchens, and J. Lauterbach; Mount Pleasant, Mr. L. McBean; Morphett Vale, Messrs. Wm. Holby, jun., and A. Jones; Boothby, Mr. A. Robb; Lipson, Mr. R. Haldane; Maitland, Mr. G. S. Greenslade; Albert, Mr. C. Setterberg; Bowhill, Mr. C. A. Evans; Dowlingville, Mr. Theo. Lambladt.

Reports by Branches.

The Secretary reported receipt, since previous meeting, of eighty-three reports of Branch meetings.

REPORTS BY BRANCHES.

Yorke town, May 13.

Present—Messrs. J. Koth (Chairman), C. Domaschensz, A. Jung, J. Dewey (Hon. Sec.), and one visitor.

SHEEP DISEASE.—Mr. Jung said his sheep had been troubled with stiffness in the legs. He removed all that could walk to another paddock, and carted thirty to his house and fed them on hay. All recovered, except one, at the house, but it was a fortnight before the last of them could get up.

CODLIN MOTH.—Mr. Koth complained that fruit affected by codlin moth caterpillars was being sent over and sold in the shops in Yorketown.

HAY.—Most of the members favor mixed hay—wheat and oats—for feeding horses; but the difficulty is to decide upon the varieties of each that will be fit to cut at the same time. Experience so far points to Early Para wheat and Cape oats as the best to sow together. Mr. Jung said he also feeds his horses, when working, with boiled barley. It was considered that hay alone is not sufficient for working horses, but it is not advisable to feed too much barley. Mr. Hughes, whose horses have to do a deal of fast travelling, do good work when fed with oats (scalded and left to stand overnight).

Davenport, May 5.

Present—Messrs. W. J. Trembath (Chairman), W. Hodahon, J. Holdsworth, T. McDowell, R. B. Randall, and J. Roberts (Hon. Sec.).

"WASTE: ITS PREVENTION AND UTILISATION."—Mr. T. McDowell read a lengthy paper. The following is a condensation:—

Never before has the matter of waste been so prominently brought under notice of farmers as at the present time—four consecutive dry seasons, almost total failure of crops, deaths of large numbers of farm animals from starvation, no feed even for poultry. All this following three or four fairly good seasons, when liberal supplies of straw, "cocky chaff," &c., could have been saved—sufficient to have saved the lives of most of the animals (especially during the first two years of drought)—accentuates the fact that there was a great lack of forethought in most of those who suffered loss. It has been urged that the cost of saving the straw and wheat husks (or "cocky chaff") would be too great; but those who had saved supplies of those food substances were now in a much better position than those who had failed to do so. The one had lost all his live stock, and the other had saved them. With respect to small holdings and gardens, the owners in this district are subject to many drawbacks, such as limited local markets, long periods of dry weather, strong and damaging winds, frequent deficiency of water, resulting in unmarketable produce and surplus. Some of this latter may be prevented

by sowing only a little seed at frequent intervals, so as to maintain a succession of maturing crops of vegetables, taking care not to sow or plant vegetables of any sort at a time when they will prematurely run to seed. This waste could be utilised in feeding cows, fowls, and pigs. But, as much of the surplus, &c., of the vegetable garden would be produced at a time when grass might be plentiful, it would be advisable to preserve it in a silo [In alternate layers of straw or hay, each layer 1ft. deep - GEN. SEC.]. Care would have to be taken not to keep more stock than the surplus would be likely to maintain.

Morgan, May 20.

Present—Messrs. J. Jackman (Chairman), C. W. F. Pfitzner, R. Windebank, E. French, L. Stubing, E. Jacobs, J. Bruhn, J. Wishart (Hon. Sec.), and one visitor.

DISTRESSED FARMERS' PERMANENT RELIEF FUND.—This Branch suggests to the committee that all future relief be in the nature of a loan, and that there be an undertaking on the part of those receiving such to repay as soon as they are in a position to do so.

CROPS AND WEATHER.—Seeding for wheat crops is now practically finished in this locality. The past month's rainfall has been very deficient, and prospects are therefore rather unsatisfactory.

Stockport, May 29.

Present Messrs. T. Megaw (Chairman), D. G. Stribling, C. W. Smith, J. Smith, J. Smith, jun., G. Burdon, F. Watts, M. Conolly, and J. Murray (Hon. Sec.).

FARMERS' RELIEF FUND.—Members favor this movement, but think a portion of the fund should be reserved for calamities other than drought affecting individual farmers.

PAPER.—Mr. Stribling read a paper on "How to Make Farm Life more Attractive," as follows:—

In the general routine of farm life there seems to be very little to entice and much that is distasteful and unpleasant; but, like other occupations, it has its advantages and its disadvantages. We may make farm life a life of drudgery, seclude ourselves from all society, deny ourselves every comfort and pleasure, see nothing or next to nothing in the world but what takes place every day in our home, our farmyard, and our fields. With such a motto for farm life we may be able to hoard money and possibly in some cases become moderately rich, but in the majority of cases money scraped together in such a fashion, whether on the farm or in a business, brings no comfort and gives no pleasure. The old saying is a true one, "All work and no play will make Jack a dull boy." Or we may swing to the other extreme, and for the sake of company, pleasure, recreation, and amusement we may neglect our home and farm duties, and either do the work at the wrong time or in the wrong way, or never do it at all. Such a life may possibly be a merry one, but it will certainly be of short duration, ending in failure, leaving the creditors to mourn over dishonored after-harvest bills; but I want to suggest a few lines on which to run in endeavoring to make farm life attractive. In the first place we must strive to make it successful and be thrifty. The wise men tells us that "The hand of the diligent maketh rich, while drowsiness will clothe a man with rags." The idler need never expect to make farm life happy—he is quite out of his place on the farm; all that he does is badly done, and brings no reward for his begrudged labor. Thrift is indispensable. Method is also required in order that we may reap the full reward of our labor. One man may work hard on the farm and still not succeed from want of proper management, while another, who makes farm life much easier, succeeds because he has tact and method in all that he does. Work on the farm must be done at the right time and in the right way. The unsuccessful farmer and the grumbler at farm life in most cases has neglected to be guided by the rules indicated. Neglect the farm work, fallow but little and that badly, let the weeds grow and produce seeds, sow late and badly, and then at harvest blame Providence that your crop is not as good as your neighbors. Successful farming brings pleasure and satisfaction to the farmer himself, and makes his position envied by all classes. "It is well to be the farmer," says the passer-by as he looks at his beautiful fields of wheat and

tries to estimate the number of bushels to the acre and the amount the farmer will be able to put in his pocket as the result of his year's labor. Good implements, too, will go a long way toward making farm life pleasant and attractive, as well as successful. It is not always that a farmer is to blame for not doing his work properly; sometimes it is the fault of the implements. There is nothing that will make farm life more irksome and unpleasant than a bad implement or one out of repair. If you want comfort and pleasure in your work see well to your implements and machinery. If they are good take good care of them, and save a great amount of worry, bad temper, inconvenience, and loss. A good team of horses will also add greatly to the pleasure of work on the farm. Have horses suitable for the work and take care of them. One bad or lazy horse will spoil the team and make work continually unpleasant. The various implements are only used at certain seasons of the year, but the team is in constant use; therefore every attention should be paid to the horses. Never cultivate more than you are able to do well. A few cows or a small flock of sheep well managed will be far more profitable. Never neglect the farmyard, but keep it as tidy as possible. Things about the homestead will always require attention; a stitch in time saves nine. Many little things can be done in this way on wet days when unable to work in the field, and for which you could not find time in finer weather. Make the home as comfortable and attractive as possible. Young people on the farm are deprived of many of the privileges of city life and very many of its pleasures; make up for the loss as far as possible in the home. Music and innocent parlor games need never be excluded. Winter evenings to the farmer and his family by their own fireside should be among their happiest hours. Let the young people have their companions and associates. Good companionship will be a pleasure and a profit to them. Let the girls have their pony and saddle, and let the farmer drive his family in his carriage and pair if he can afford to do so. Of course all this must be done in reason, and with a mixture of good common sense. Trades people and business people have their holidays; why not the farmer? Unfortunately they are unable to take advantage of the holiday seasons. Christmas and New Year's holidays come in the midst of harvest. Easter comes when they are preparing for seeding, and so they are unable to take advantage of the excursion fares. I suggest that a portion of two months in each year should be recognised as the farmers' holiday, say during February and September. In those months farmers' gatherings, such as shows, farmers' picnics, holiday tours, and various recreations should be arranged; and during those periods excursion fares on all our railways to all parts of the colony should be granted, and where practicable special holiday trains to the various holiday resorts should be run. This would give the farmer and his employees an opportunity to visit their friends in any part of the colony, and I feel sure the Railway Department would be gainers by the departure. This matter might be recommended for discussion by other Branches, so that something practical might come of it. I should like to see farmers as a body more united than they are at the present time, and give more united attention to all matters concerning their own wellbeing and their own interest, and try and make farm life a thousand times happier and better than it has ever been.

It was decided to ask the Central Bureau to submit the question of farmers' excursion train to the Branches for discussion. Members generally agreed that farm life might be made more attractive by social evenings, &c., as suggested by Mr. Stribling. [Will Branches discuss suggestion re excursion trains.—GEN. SEC.]

Mundoora, May 25.

Present—Messrs. R. Harris (Chairman), W. H. Mitchell, W. Aitchison, D. Smith, G. Haines, J. J. Vanstone, W. J. Shearer, J. Loveridge, J. Blake, A. McDonald, and A. E. Gardiner (Hon. Sec.).

STOCK COMPLAINTS.—The Chairman read a leaflet by the Chief Inspector of Stock on this subject, and a discussion ensued on tuberculosis. Members were surprised to learn of the prevalence of this disease and the different forms it takes. The leaflet was regarded as very instructive and useful to stockowners, and the Hon. Secretary was instructed to file it so that it could be referred to by owners of stock.

CONFERENCE.—Delegates reported on the proceedings of Conference of Branches held at Port Broughton on April 26. They considered that a mistake was made in holding the Conference at such a busy time, which accounted for the comparative failure of the meeting.

TREE-PLANTING.—The Chairman urged on members the necessity for planting trees on their land, and advised that as many as possible should be

planted this year. The land should be well prepared at once in readiness for the planting season. The Hon. Secretary was instructed to obtain a large number of trees for the members from the forest nursery.

MEMBERSHIP.—The death of Mr. N. J. Francis, a member of the Branch, was reported. It was decided to send a letter of condolence to the family.

Burra, May 26.

Present—**Messrs.** F. A. S. Field (Chairman), J. Flower, F. Duldig, W. Heinrich, W. G. Hawkes, Jno. Scott, and R. M. Harvey (Hon. Sec.).

CONGRESS.—Discussion ensued on circular from Central Bureau *re* Congress to be held in September, and delegates were appointed to represent the Branch.

DAIRYING.—A discussion took place on this subject, and it was decided to apply to the Department for loan of a Holstein bull.

OTHER BUSINESS.—The destruction of sparrows and the pickling of seed wheat were also discussed.

Norton's Summit, May 12.

Present—**Messrs.** J. Jennings (Chairman), J. Pellew, C. W. Giles, J. Hank, J. Cowling, and W. H. Osborn (Hon. Sec.).

CODLIN MOTH.—This Branch takes exception to a paragraph by the Editor in May issue of the *Journal of Agriculture and Industry* *re* sale of wormy apples. That wormy apples should be allowed to be sold is the unanimous opinion of growers in this neighborhood, and is therefore not the argument of one or two wealthy fruitgrowers. This year it is a recognised fact that apples are not scarce, but plentiful. The low figures quoted are the prices to the wholesale buyer, not to the poor consumer. If apples can be cleaned sufficiently for cider or vinegar manufacture they can be far more readily cleaned fit for eating. The statement that the best possible way to check the spread of the pest was to prevent the removal of wormy fruit from the orchard is regarded by the members as a wild and insane statement. Would the Editor guarantee this would eradicate the pest? Would not the importers be allowed to import apples and reintroduce this pest with others as they are allowed to do now? Prohibition is not considered by the Editor to be too severe for the local grower, but the prohibition of foreign fruit which is likely to introduce the fruit fly is pooh-poohed as being too serious to the importer. [The poor Editor is glad to know that a lot of fruitgrowers are, like himself, "wild and insane" enough to believe that the best way to check the spread of the codlin moth is to prohibit the distribution of affected fruit. That it would *eradicate* the pest has not been claimed. Apples may be plentiful this year in some localities, but the average season's crop has undoubtedly been deficient, and it is certain the price for good keeping apples has not been so low as in ordinarily plentiful seasons. The statement of the members that apples are not sold at 1s. to 3s. per case in good seasons to consumers could be proved incorrect by very many private people in and around Adelaide who have purchased at such prices. If local growers are allowed to sell infested fruit they cannot consistently ask that infested fruit from Tasmania and elsewhere should be kept out. The statement that importers are allowed to introduce pests now is absolutely incorrect. The Editor regrets that the members of the Norton's Summit Branch should be incapable of seeing the difference between prohibiting the sale of *infested* fruit and prohibiting the introduction of *clean* fruit. A lot has been said about selling infested fruit *cheaply* for the sake of the poorer classes, but how many growers would agree to it being required in

the interests of the consumers that such fruit should be ticketed in the windows "Codlin moth infested fruit," so that those who wanted such fruit cheap could have it, and those who objected to fruit fouled by the caterpillars would receive what they pay for instead of having filthy fruit foisted on them?—EDITOR.]

PEACH CURL-LEAF.—Members were of opinion that in the note in May *Journal* of results of spraying to suppress peach curl-leaf (*Exoascus deformans*) there has been an error of identification, as *Exoascus deformans* affects the leaves, not the fruit. [The article in question states that Bordeaux mixture properly sprayed on the trees did not absolutely prevent curl, but enough *fohage* was held to prevent the fruit dropping. It does not say anywhere that the curl affected the fruit directly, but every grower, with any experience of peach curl-leaf, knows that if the leaves are generally affected the fruit suffers, either by dropping or failing to mature as it should. To this the successful results from the use of Bordeaux mixture is attributed.—EDITOR.]

Kadina, June 1.

Present—Messrs. T. M. Rendell (Chairman), S. Small, S. Roberts. Jas. Ward, M. Quinn, H. Johnson, and J. W. Taylor (Hon. Sec.).

BUSINESS.—It was decided to bring the matter of Congress forward at next meeting. The Chairman stated that some months back arrangements were made for members to take it in turn to read papers. This worked well for a time, but had fallen through. He strongly urged the members to make it their duty to bring some business forward at the meetings. If they would do this the meetings would be made of great interest. Mr. Small referred to question of grasses for the drift sand, which was a great trouble to farmers in the scrub districts. He thought the members should pick out some subjects which they would like to have discussed, and when no regular paper was forthcoming they could bring them forward. This was agreed to.

Mount Remarkable, May 25.

Present—Messrs. A. Mitchell (Chairman), G. Yates, W. Lange, C. E. Jorgensen, T. P. Yates, H. B. Ewens, H. Humphries, J. B. Murrell, D. Roper, J. H. Girdham, and T. H. Casley (Hon. Sec.).

FARMERS' PERMANENT RELIEF FUND.—Members are of the opinion that no such fund is required.

DEEP CULTIVATION.—Mr. D. Roper read a paper upon this subject to the following effect:—

No hard and fast rules could be laid down. It is only when all conditions are favorable that any specific course can be carried out. The benefits of deep cultivation have not been fully understood. There is a vast difference between deep cultivation and deep ploughing as ordinarily understood. Every one knows that plants depend principally upon the food constituents obtained from the soil, where it is stored up until required. In order to make this plant-food readily available, the husbandman must break up and pulverise the soil, so that the roots of the plants can readily traverse it, as well as to freely admit air and water, both absolutely essential to the life and welfare of the plants. Only so much of the soil that can be made freely permeable, and is permeated by air and water can possibly prove beneficial to plants, because these two agencies are absolutely necessary in rendering the stored-up plant-food available for transmission by the roots to the various parts of the plant. If the soil is compact, very little of it is permeated by air and moisture, and the remainder is useless for the support of plant life. If rain falls, or water is supplied otherwise, only a little soaks into the indurated soil, and the rest flows away; but if the soil is finely divided by the implements of cultivation, very much more moisture is absorbed and retained, and this makes available a great deal more nutriment for the plants. If $\frac{1}{2}$ in. of rain falls on land loosened only 3 in. or 4 in. deep, it mostly remains there, and anything beyond the absorptive and retentive power of that 4 in. of

soil will flow away on the surface of the hard pan beneath, and the 4in. of soil will quickly lose its moisture through evaporation. If more rain should fall than the soil will hold in suspension, then that soil becomes sloppy or over-saturated—a condition quite unfavorable to the plants, because the other necessary element, air, would be excluded, and the roots would be drowned. If the soil were pulverised to a depth of 6in. or 8in., its retentive capacity would be more than doubled, and the liability to become dry through evaporation would be very considerably reduced. The soil would be far less liable to become soddened, and air and moisture would be well distributed throughout the mass. Whether to cultivate deeply or not must, however, depend greatly upon the nature of the soil, especially the subsoil. Where the alluvium is naturally deep and fairly friable, and the rainfall only medium or rather scanty, there can be little doubt that deep and perfect tillage will be beneficial by conserving or retaining much more of the moisture than would be retained in shallow-cultivated soil. The term "cultivation" should not be confused with "ploughing." In ploughing 6in. to 8in. deep, the inorganic matter of the subsoil must necessarily be brought on to the surface, and this is undesirable. This would, perhaps, explain the experience of a farmer who ploughed 6in. The season turned out dry, and he had no crop, whilst his neighbor who ploughed 2in. deep had a return. Next year, with moderate rainfall, the deeply-ploughed land returned heavily, whilst the neighbor's failed. The explanation was that the inorganic matter was brought to the surface, the drought setting in prevented the roots reaching the buried fertile soil, and the plants were killed by the excess of lime, magnesia, etc. Next year the conditions were reversed, and success followed. The three important points resulting from deep and thorough cultivation are (1) increase of plant-food; (2) easy access to the soil for the roots of plants; (3) retention of a larger amount of moisture and free admission of air. [N.B.—The above is a very free rendition of Mr. Roper's rather lengthy paper.—GEN. SEC.]

Mr. Jorgensen thought that where the subsoil consists of limestone rubble it should not be disturbed.

Elbow Hill, May 30.

Present—Messrs. E. Wake (Chairman), W. Beinke, W. Ward, H. T. Styles, C. G. Ward, H. Dunn, W. Spence, J. Harvey, G. Wheeler (Hon. Sec.), and five visitors.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the past year eleven meetings were held, with an average attendance of eleven members and ten visitors. Thirteen papers on practical subjects had been read, and these and a number of other matters discussed. The value of a Branch Bureau was exactly what its members made it. To have a live Branch the members must take a lively interest in the work. Members were of opinion that the Branch had been of real service to the farming community of the district. Mr. H. T. Styles was elected Chairman and Mr. G. Wheeler re-elected Hon. Secretary for the ensuing year.

FARMERS' RELIEF FUND.—Mr. H. T. Styles read a paper on this subject, in which he suggested that the support accorded to the fund raised for the help of those farmers suffering from the effects of the drought would not be continued to a permanent relief fund. In his opinion, however, farmers would subscribe to a local fund to give relief in the form of seed wheat or otherwise to anyone in the district in temporary need of such assistance. A vote was taken and carried against the establishment of the proposed permanent relief fund, and a committee was appointed to draw up a scheme for a local relief fund, as suggested by Mr. Styles.

Holder, May 27.

Present—Messrs. F. A. Grant (Chairman), F. Slater, E. Crocker (acting Hon. Sec.), H. Vaughan, J. Green, J. Maddock, P. J. Brougham, and F. G. Rogers.

PAPER.—Mr. Crocker read a paper on "Finance in Cultivation." Thanked.

RAINFALL.—From January 1 to date, 6.07 inches.

Benmark, May 26.

Present—Messrs. H. Showell (Chairman), W. H. Harrison, W. H. Waters, H. Swiney, R. V. Bostock, E. Taylor (Hon. Sec.), and one visitor.

SULTANAS.—Mr. Harrison read a paper upon cultivation and treatment of sultana grape vines and grapes. A long discussion followed.

QUESTIONS.—Best sort of sunflower and time for sowing?—Large seeded black Russian; sow in September. How to use stinkwort in bacon-curing?—Dry, mixed with half hardwood or cedar sawdust. Remedy for cabbage aphid?—Spray all over with kerosene emulsion or quassia and soap decoction. [It is utterly useless to apply London purple or Paris green for insects which do not gnaw.—GEN. SEC.]

Pine Forest, May 23.

Present—Messrs. W. H. Jettner (Chairman), A. Mudge, J. Phillis, E. Masters, F. Masters, F. Inglis, G. Inkster, and R. Barr, jun. (Hon. Sec.)

COMBINED SHOW.—Initiatory work connected with the annual combined Branches Show was transacted.

FARM BUILDINGS.—In this district, now that most of the pine trees have been destroyed, and where there is abundance of surface limestone, this will be found more substantial and nearly as cheap for walls as pine. Implements, machinery, &c., suffer more from exposure than from work, and it will pay well to erect substantial sheds for their shelter. Farmers ought to be able to build these. Aspect and exposure should be considered, and it would be well to have the entrances face eastward. It was unanimously decided that stone walls and iron roofs are the best buildings for this district.

DOGS AND SHEEP.—The Chairman advocated a heavier registration fee on sporting dogs, with a view to minimise damage to sheep. One sheep or cattle dog should be allowed free on each farm. Other members considered a tax of 5s. on each dog to be reasonable. If a dog were not worth paying an annual fee of 5s. to the farmer, it ought to be destroyed. One member suggested a progressive tax on number of dogs kept for hunting purposes. A resolution was carried—"That greater vigilance ought to be exercised by councillors to see that all dogs in their districts are registered."

Stansbury, June 3.

Present—Messrs. Alex. Anderson (Chairman), G. Jones, P. Cornish, J. Sherriff, P. Anderson, J. Henderson, and C. Faulkner.

MANURES FOR GRAPE VINES.—Members stated that grape vines had hitherto thriven so well in this locality that there had been no necessity to use fertilisers, but in case such need should arise it would be desirable to learn what plant-food would be likely to be deficient. [About 700lbs. per acre of a fertiliser containing 65lbs. available phosphoric acid and 100lbs. potash is recommended by some people who profess to a knowledge of the subject.—GEN. SEC.]

OLIVE OIL.—Some of the members desire to know how to clarify newly-pressed olive oil. [See article in July issue of *Journal of Agriculture*.—GEN. SEC.]

SCALE ON FIG TREES.—Mr Jones said his fig trees had a small flat yellow scale on the leaves. [Most probably a *Lecanium* sp. All fallen leaves should be raked up and burned, and the trees sprayed with the lime, salt, and sulphur mixture during the dormant season.—GEN. SEC.]

WINE.—Mr. P. Anderson read a paper on the subject of "Wine," in which he referred to the very great improvement in the character of South Australian wines during the past few years, their wholesomeness, their appreciation by the medical faculty where necessary to be employed, the recent favorable comparison with French wines brought over by Mr. Pridmore. He also spoke in scathing terms of the Local Option Bill; referred to the fact that in countries where wine is used as a common beverage by all classes the people are more temperate than where no wine is used; and mentioned that Mr. John Riddoch had noted that in India there is a rapidly-increasing appreciation of Australian wines. This would partly recoup Australia for the amount spent on Indian tea, and he would like to see China acting in a similar manner. He believed that wine was made before the Noachian period, and that when Noah planted a vineyard after the flood he only resumed an old practice. Wine was only injurious when imbibed in excess.

Hawker, May 24.

Present—Messrs. S. Irvine (Chairman), F. C. Hirsch, R. Wardell, W. J. Schuppan, J. Smith (Hon. Sec.), and one visitor.

HARROWING GROWING CROPS.—Members agreed that the best time for harrowing growing crops is after rain.

PICKLING WHEAT.—Mr. Irvine considered that some farmers were too careless in pickling their seed wheat. They looked upon it as extra work, but it was work that should be well done. Three minutes' time was not sufficient to allow of every grain in a bag becoming pickled. There was a deal of inferior bluestone being sold, and something should be done to prevent this being done. The Hon. Secretary said that the grain should be turned out of the bag and repeatedly turned over whilst the grain was being pickled.

PIGS.—Mr. Hirsch said he had realised good returns from breeding pigs. If properly managed, pigs were a source of profit, and no farmer should be without them.

Mount Bryan East, May 27.

Present—Messrs. W. Bryce (Chairman), T. Best, R. Webber, and W. Dare (Hon. Sec.).

PARROTS.—Mr. Best produced a parcel of wheat grains taken from the craws of two ring-necked parrots, showing the amount of damage these birds will do to newly-sown crops.

FALLOW.—Messrs. Best and Dare are of the opinion that late fallowing is best, providing the rubbish has been kept down before it is ploughed and kept stocked after ploughing.

RABBIT, BEEF, MUTTON.—Mr. Best wishes to learn what is the food value of rabbit flesh as compared with beef and mutton.

Mount Pleasant, June 9.

Present—Messrs. G. Phillis (Chairman), H. A. Giles, H. Dragomuller, J. A. Naismith, W. Lyddon, W. Vigar, J. Maxwell, J. F. Miller, R. Godfree, F. Thomson, J. McConnell, H. T. Hull (Hon. Sec.), and one visitor.

CEREAL EXPERIMENTS.—Mr. Giles reported receipt of twenty bags Foxtail seed oats of good quality from Tasmania. The cost of the oats, free on board, was 1s. 4d. per bushel, but freight, duty, and other charges made the

cost to the Branch 3s. 5d. per bushel. Mr. Thomson reported that he was trying Clucas's Early Eclipse and Petatz Surprise wheats—all new to the district. Mr. Giles is trying King's Early and Baroota Wonder, and Mr. Lyddon the Old Red Straw.

ANNUAL REPORT.—The Hon. Secretary reported nine meetings having been held during the year, with an average attendance of eight members. Mr. G. Phillis was re-elected Chairman and the Rev. H. T. Hull re-elected Hon. Secretary.

DRILLING v. BROADCASTING.—Mr. Lyddon undertook to carry out some practical experiments on behalf of the Branch to test the relative merits of drilling and broadcasting seed. The points to be determined are—(1) time taken, (2) strength of teams required, (3) quantity of seed, (4) returns; ground to be sown same day, and results to be measured by members of the Branch at harvest.

Port Pirie, May 25.

Present—Messrs. P. J. Spain (Chairman), W. Wood, T. Gambrell, A. Wilson, G. M. Wright, H. B. Welsh, G. Robertson, E. J. Hector, W. Smith, and R. J. Ferry (Hon. Sec.).

CODLIN MOTH.—Mr. Wood reported that, in company with the other honorary inspector, he had inspected nearly all the fruit shops in the town, and only in one or two places had they found traces of the caterpillar, but no living insects. A second inspection gave even more satisfactory results. A vote of thanks to the hon. inspectors was unanimously accorded.

FARMERS' PERMANENT RELIEF FUND.—With one exception, members were of opinion that a relief fund is necessary, but it should not be permanent. Mr. Wood also thought that the most permanent relief would be to assist the farmers in the drought-stricken districts to remove to localities where there is a rainfall. The bad lands where they are now located could be let at a nominal rental for sheep-farming.

Morphett Vale, June 8.

Present—Messrs. L. F. Christie (Chairman), H. Liston, F. Hutchinson, J. Bain, J. Depledge, A. Ross Reid (Hon. Sec.), and three visitors.

PRUNING AFRICAN BOXTHORN.—In answer to a question, it was recommended not to prune African boxthorn later than end of April; but during summer and autumn it may be pruned two or three times, if necessary.

GRAPES OR HAY, WHICH?—The Hon. Secretary read a paper, as follows:—

The facts and figures hereafter quoted (as concerns this district) are as nearly as possible accurate, as taken from my own experience of growing fairly large areas of hay and of vines during the past five years.

Planting vines on poor third-rate soil is a mistake not likely to be again made in this district. Vines require a good deal of work, and that work might better be put into good land than upon bad. A good vineyard is a very valuable asset, but a bad one is almost always unprofitable.

It does not require an expert to plant and look after a vineyard. Any common-sense, practical man can do it, and in the pruning—an operation requiring some knowledge—advice and a few lessons free can always be obtained from any of the older growers or winemakers. Any sensible man can learn to spur-prune in an hour or two. But how many vineyards are there in this district only returning one-half of what they should, because the owner thinks he can prune, and will not take the trouble to go and have a look at what other people are doing. One great fault is in not giving spur-pruned vines enough spurs. A vine of eight years old can carry ten spurs, and, in some cases, more.

Now we will return to our subject of cost per acre. Take the value of the land at £7 per acre, and interest on outlay at 5 per cent ; also spread the calculation over three years, so as to include one fallow for the hay crop :—

<i>Hay-growing, per Acre.</i>		£	s.	d.
Three years rent at 7s.		1	1	0
Ploughing fallow		0	6	6
Two scarifyings and one harrowing (summer)		0	4	9
One scarifying before the drill		0	2	0
Drilling		0	2	6
Manure		0	7	0
Seed at 3s. 6d. (pickled)		0	4	0
Harrowing, rolling		0	1	6
Mowing, stooking, stacking		0	10	0
Ploughing stubble, and harrowing		0	6	9
Drilling, seed, manure		0	13	6
Harrowing, rolling		0	1	6
Mowing, stooking, and stacking		0	10	0
		4	11	0

	Tons.	Result.	£	s.	d.
First year	2				
Second year ..	1				
3 at £2			6	0	0
Balance			£1	9	0

This balance of £1 9s. is for a period of three years. Balance of profit per year, 9s. 8d. My price per ton was taken in the stack unthatched.

Grape-growing, per Acre (Mataro).

The vineyard, including interest and all other expenses, land, vines, &c., will have cost by the time it is in full bearing £20 per acre. At this price, after that period, we must reckon the rental at 5 per cent. of £20, or £1 per annum.

	£	s.	d.
Three years' rent	3	0	0
Six ploughings at 4s. 6d.	1	7	0
Nine scarifyings at 2s.	0	18	0
Twelve harrowings at 9d.	0	9	0
Three years' pruning	0	18	9
Burning or carting cuttings	0	2	3
Picking at 8s.	1	4	0
	7	19	0
Six tons of grapes at £2 5s.	13	10	0
Balance, three years	£5	11	0
Balance, one year	£1	17	0

The price per ton is in the vineyard, but picked, which will be about the value next year, and the tendency in future will be for grapes to go up in value. Of course these figures can be possibly altered ; but so can the hay-growing figures, and I maintain that, if anything, the profits on the hay-growing need reducing the most.

I would not advise any farmer to give up hay-growing altogether in favor of vines ; but I do advise that every farmer in this district should have a patch of vines in proportion to the size of his farm. If he employs no outside help, then, perhaps, four or five acres would be the most profitable size for him, but a somewhat larger area is more economical to work.

The work in a vineyard always requires to be done when the average farmer has little else to do. The pruning and ploughing can follow the finish of seeding, and any summer cultivation can always be fitted in with other similar work. The picking takes place at the least busy time of the year, and even planting does not clash with any important farm work. Even the cuttings from the vineyard are of great service as firewood. I would not advise any man to plant a vineyard who does not mean to look after it.

OLD PLOUGHS.—Mr. Bain produced an old ploughshare, weighing 26lbs., as used for subsoiling in the early days.

OFFICERS.—Messrs. L. F. Christie and A. Ross Reid were unanimously re-elected Chairman and Hon. Secretary respectively.

Port Germein, June 3.

Present—Messrs. G. Stone (Chairman), J. K. Deer, W. Broadbear, D. Thompson, W. Crittenden, J. R. Gluyas, and A. H. Thomas (Hon. Sec.).

DEEP OR SHALLOW SOWING?—Early-sown wheat this season is growing very thin and spindled. The Chairman thought the seed was sown too deeply. It is very easy to do this with the drill. Members are of opinion that on stiff soil the seed should be sown only about an inch deep, and the field should be harrowed after rain to prevent the ground caking.

STANDARD WEIGHT.—Members think that the means adopted by wheat-buyers for testing the weight of parcels of wheat are not at all satisfactory; also, that the farmers should be represented when the corn trade section of the Chamber of Commerce undertake to fix the weight of a standard bushel of the wheat of the whole colony for each season.

RAINFALL.—For May, 2'40in.

Maitland, June 3.

Present—Messrs. H. Wundersitz (Chairman), A. Jarrett, O. Treasure, J. Kelly, C. F. G. Heinrich, J. Hill, J. S. McLeod, and C. W. Wood (Hon. Sec.).

MANURING.—The subject set down for discussion was the experiences of members of drilling in the seed with manure last season. Mr. Wundersitz got 16bush. per acre from land sown with 56lbs. English super., as compared with 8bush. from broadcasted on unmanured land. Mr. Kelly put in on good land as much thoroughly rotted manure as he could get through the drill; return, 16bush. per acre; English super., 16bush.; 2cwts. of English super. mixed with four bags of wheat after pickling, and sown broadcast, yielded 8bush. per acre. Mr. Heinrich, 17bush. per acre, with 80lbs. English super., 19bush. with 120lbs. super. guano, and 15bush. on very good land broadcasted without manure. Salt was put on one round of the drill, and the best return came from this plot. Mr. Hill averaged three bags per acre without manure, and the same from a small area of drilled and manured crop, but this portion was affected by a heavy storm. Mr. Treasure's drilled crop averaged 7bush., but was very "smutty." He got no result from use of Thomas phosphate. These returns, are, with the one exception, from large areas, and not small plots. Most of the members have tried Thomas phosphate, but with the exception of Mr. Jarrett, who has had favorable results from it, they do not consider it suitable for this district. Messrs. Jarrett and Hill referred to the great importance of thorough working of the land previous to drilling in the crop. Mr. Jarrett worked some of his land seven times, and last season got between 24bush. and 28bush. per acre.

BUNT.—Most of the crops last season were more or less affected by bunt. Mr. Hill said his crops were clean, the seed being pickled with lime. He has found pickling with lime much more satisfactory than with bluestone.

Boothby, May 30.

Present—Messrs. J. T. Whyte (Chairman), H. S. Robinson, T. Robinson, G. T. Way, H. G. Evans, J. A. Foulds, M. Leonard, R. Chaplin, and R. M. Whyte (Hon. Sec.).

WORN WHEELBOXES.—Mr. Evans showed model of a sleeve to fit into the interior of a worn-out cast-iron wheel. He has used a similar contrivance for a year.

DRILLS AND MANURES.—Mr. Foulds wanted to know which is the best manure to sow broadcast on poor patches of land. [It all depends upon what

plant-food is wanting. For cereals superphosphate of lime is generally very beneficial, but it might be necessary also to add nitrate of potash or sulphate of ammonia and muriate of potash.—GEN. SEC.] He thought the drills should be not less than 1ft. apart, and that by using 1cwt. of manure [? phosphatic] per acre on poor land an average of 10bush. could be secured in fair seasons. Some other members thought it would not pay to manure very poor land. Mr. Leonard thought it would pay to have soil analysed before applying manure.

WHEAT CULTIVATION.—Mr. Leonard read a paper on this subject. He thought the returns in this district, though not so low as in other parts during the past three years, were capable of considerable improvement. He put the small returns down to deficient rainfall and bad cultivation. The former they could not affect, but they should make the most of the rain by good cultivation. The area of virgin land in the district was rapidly being lessened, but by aid of the seed drill and fertilisers they could get profitable yields from old land. The results will, however, be disappointing unless the soil is worked thoroughly. The land should be fallowed in June and July to allow the bulk of the winter rains to soak in. It should be skim ploughed about end of September, and, if necessary, harrowed. It will then be an easy matter to secure a good seed bed in May. This would, of course, necessitate smaller areas being cropped, but they would get quite as much wheat, and there would be a considerable saving of work, wear and tear of implements, &c., besides leaving more land available for grazing. It has been frequently remarked that their scrub land was not improved by fallowing, but he did not consider that early fallowing had been sufficiently tested to warrant such assertions. Considerable discussion followed, during which the question of selling bags as wheat was referred to, some members being of opinion that the present system was advantageous to the farmer.

Redhill, May 30.

Present—Messrs. S. H. Treloar (Chairman), A. A. Robertson, R. H. Siviour, F. Wheaton, G. Wheaton, H. Darwin, and T. McDonald (Hon. Sec.).

FRUIT-GROWING.—Mr. Darwin asked whether it would not be possible to grow fruit successfully in this district by the aid of irrigation. Most of the members consider that the water in the wells is unsuitable for irrigation; also in much of the soil there is a fairly large percentage of salt, which seems to come to the surface when the land has been irrigated.

WEEDS.—A discussion took place on this subject. Stinkwort, which some Branches would class as a noxious weed, is considered very useful in this district. Coming as it does when all grasses are dry, it is excellent for sheep.

Johnsburg, June 3.

Present—Messrs. F. W. Hombsch (Chairman), T. A. Thomas, T. Thomas, W. McRitchie, L. Chalmers, P. Caughlan, J. Sparks, T. Potter, F. Potter, T. Johnson (Hon. Sec.), and one visitor.

PERMANENT RELIEF FUND FOR DISTRESSED FARMERS.—Members are entirely opposed to the formation of a relief fund on the lines indicated by the Central Bureau, and the following resolution was carried unanimously:—“That, as a Branch of the Agricultural Bureau, we disapprove of the formation of a permanent relief fund for distressed farmers in the manner suggested by the Central Bureau, and that we respectfully refer the Central Bureau to a

paper read by Mr. T. A. Thomas before this Branch in May, 1898, which advocated the establishment of a reserve fund for farmers, and of which we approve."

SUBJECTS FOR CONSIDERATION.—It was decided that each member, in turn, should be prepared to bring forward some practical or useful matter for discussion, provided he cannot prepare a paper.

OFFICERS.—The Chairman and Hon. Secretary were thanked and re-elected.

FOURTH ANNUAL REPORT.—The Chairman and Hon. Secretary reported that the long drought extending over the whole of the Upper North, as well as adjacent colonies, had not yet broken up, therefore progress had not been so marked as it would have been under the auspices of the Branch had the seasons been more favorable. These reverses, however, had not been without their useful lessons, and a small rainfall last season had resulted in a little return of produce last season, whilst feed for stock had been moderately plentiful. Eight meetings had been held during the past year, with an average attendance of nearly ten members. Nine visitors had attended, and a recess of four months had taken place. Three papers had been read and well discussed, one meeting having taken place at Mr. Dunn's homestead.

Lipson, May 20.

Present—Messrs. F. Potter (Chairman), G. Provis, J. McCallum, C. Provis, Geo. Carr, E. J. Barraud (Hon. Sec.), and one visitor.

SORE SHOULDERS.—In reply to a question by Mr. Geo. Provis, the members recommended the following treatment for sore shoulders in horses:—Place pads under the collar; cut out a piece on the place where it galls the shoulder to prevent the collar from pressing on the sore. In less severe cases shifting the stuffing of the collar will be sufficient. [The sore should be washed with warm water and a little carbolic oil rubbed in.—GEN. SEC.]

OFFICERS.—Messrs. F. Potter, Geo. Provis, and E. J. Barraud were re-elected Chairman, Vice-chairman, and Hon. Secretary respectively.

Richman's Creek, May 22.

Present—Messrs. W. Freebairn (Chairman), J. M. Kelly, A. Knauerhase, W. J. Wright, J. J. Grant, M. Hender, A. Nicholson, J. McSkimming, J. McColl (Hon. Sec.), and one visitor.

WINDBREAKS AND SHELTERS.—Mr. Knauerhase read a very interesting paper upon "Tree-planting for Shelter and Windbreaks." The following is a condensation:—

As tree-planting season is close at hand, it will be worth while to consider the matter now. Although tree-planting does not give immediate pecuniary results, the indirect benefits will become apparent within a short time in making the surroundings more attractive and comfortable for man and beast. For several years in succession he had procured young sugargum trees from the Mount Brown Forest nursery, but they failed to grow, probably through the lapse of time between the removal and replanting, or maybe the change of climate. Pot plants, open root plants, and plants in bamboos were tried. The latter were attacked by termites, or white ants, and killed. Then an attempt was made to raise trees on the farm from seeds. The first year the seeds were covered too deeply, and failed to come up; but next year the attempt was successful. Shallow boxes were nearly filled with fine sand, then seed was sown, and covered with a quarter inch of sand. Sown in March, and the trees will be fit to plant out in July or August. When the seeds were sown in tins, and singled, the plants grew large in less time, but there is no advantage gained. The seedlings were raised in a structure several feet above ground, in a somewhat sheltered place, where frost cannot injure them too much; but still the seedlings need to be exposed to some cold, else they will not withstand the severe weather later on. Pepper trees can be raised in the same way, and, as these and gums

bear a good deal of seed, there is no need to purchase when there are trees growing on the farm. They should be gathered in summer, and laid in the sun for a few days. *Tamarix gallica* grows easily from cuttings, but sheds its leaves in winter. Of the three, sugargums are best for shelter and windbreaks, but they should not be trimmed. He had planted these 10ft. apart in holes 20in. x 20in.; but deep ploughing is better, though this cannot easily be done near homes. If planted early in the season, protect from frost, by enclosing with bagging fixed to four stakes. In this locality young trees require a good deal of attention over the first summer, and water must be supplied if there is not enough in the soil. Most of his failures had been due to planting out too early, and not protecting against frost during the first season. In this district trees could only be established under great difficulties, as Nature and soil appeared to be against it, and doubtless there were places where trees cannot be grown. It had been said—"Why not protect the young redgums which spring up naturally in the beds of the creeks?" This could be done in some cases, but often the floods came down and washed away trees and soil together; and it was not always convenient to enclose the land, which was required for grazing purposes; and the cattle destroy the trees.

The Hon. Secretary said some farmers had fenced off a few of the bends of the creeks, and the young gums came up and grew rapidly. They required this protection four or five years. It was difficult to maintain these fences, as the floods often carried them away. Mr. Hender favored the lopping of sugargums if required for shade, as they naturally grow tall and sparse of branches. Mr. Kelly directed attention to the fact that tamarix foliage surpasses sheoak as fodder for stock.

BIRDS NESTING.—Several members had noticed that birds were building their nests this year earlier than usual.

Narridy, May 20.

Present—Messrs. A. Bairstow (Chairman), J. C. Myatt, J. Liddle, J. Nicholson, D. Creeden, W. J. Martin, and James Darley (Hon. Sec.).

BUSINESS.—Several items were considered, but decisions were postponed until next meeting.

Kapunda, June 3.

Present—Messrs. H. T. Morris (Chairman), J. P. Orchard, H. King, Peter Kerin, W. Flavel, Patrick Kerin, J. H. Pascoe, J. A. Schultz, G. Harris, J. J. O'Sullivan, and T. Jeffs (Hon. Sec.).

EXHIBIT.—Mr. Morris tabled a pumpkin, weighing 50lbs., grown from seed supplied by Central Bureau.

DISTRESSED FARMERS' PERMANENT RELIEF FUND.—Mr. Flavel read a paper on this subject; the following is the substance:—

Is the formation of a permanent fund for the relief of distressed farmers a move in the right direction? That there are many farmers in the colony in indigent circumstances cannot be denied; but they are nearly all to be found in country with a very limited rainfall, that was never intended by nature for wheat-growing. Whoever endeavors to work against the laws of nature must almost certainly fail, and that has been the experience of settlers in the dry parts of the colony. The worst mistakes made were in the selection of farms on bare, open plains, and then wasting labor and capital in building, fencing, and in fifty other ways. The settlers put in a crop and wait for rain. Sometimes they get a little—just enough to malt the greater portion of the seed that was sown, and what does grow is thin, so that when the crop is reaped the returns in many cases are less than the quantity of wheat sown. But there are accidental wet seasons, when the rains fall at the right time to produce a payable crop—on an average of about once in seven years. That accidental crop encourages the farmer to try again, and sometimes they get two wet seasons in succession, but oftener four dry ones in succession. The farmers are not the only ones depending on the crops and suffer through their failure. The storekeepers, who have supplied them with goods, have many of them been ruined because the farmers were unable to pay. Is it, therefore, an act of charity to try, by relieving such families, to induce them to remain farming there under such starvation conditions? My impression is that it would be better for the farmers in those parts to leave the districts, if they cannot live without a permanent fund, than be a constant burden on the State.

Albert, June 3.

Present—Messrs. J. Wetherall (Chairman), G. Holmes, G. Munn, A. B. Struthers, R. C. Norton, W. Farley, R. C. Rasmussen, W. H. Clarke, T. Cooper, and H. L. Smith (Hon. Sec.).

EXHIBIT.—Mr. W. H. Clarke tabled some wheat in blossom, 5ft. 2in. high, grown under irrigation from seed sown last December.

PLOUGHING.—Mr. Wetherall read a paper on "Ploughs and Ploughing," which was discussed.

TICK IN FOWLS.—Mr. Munn was advised to burn his fowlhouse which is infested with Argas reflexus, and to dip his fowls in a solution of sheep dip. [Flannel damped with kerosene and rubbed gently on the bare skin of the thighs and under wings will kill the ticks in fowls, but there is no remedy more effective than fire for ticks in a wooden fowlhouse.—GEN. SEC.]

RABBIT POISON.—Members are of opinion that phosphorised pollard is the best thing to destroy rabbits.

Millicent, June 1.

Present—Messrs. R. Campbell (Chairman), H. Hart, H. F. Holzgreffe, A. McRostie, W. J. Whennen, L. Oberlander, W. R. Foster, B. Varcoe, W. H. Rich, H. A. Stewart, and E. J. Harris (Hon. Sec.).

SEED DRILLS.—It was decided to leave proposed trial of seed drills to the agents of the several drills, but the Branch will arrange for trial if desired. Some discussion arose on the merits of the respective drills, and it was stated that two recently imported of a special make had proved unsuitable on sticky land.

JOURNAL OF AGRICULTURE.—The Chairman called attention to the action of several newspapers in annexing articles, &c., from the *Journal of Agriculture and Industry* without any acknowledgment. This action was complimentary, but unfair. The Branch suggested that all original matter in the *Journal* be copyrighted, but liberty be given to newspapers to republish anything on making the usual acknowledgment.

TREE-PLANTING.—In reply to question *re* planting yate gums and other trees on the Wylie Swamp, Mr. Hart recommended sowing seed in September in nursery beds. When the plants are dormant after a spell of dry weather, and before the autumn rains, take them up carefully, and cover with moist earth until planted. The holes should be prepared beforehand, the soil carefully filled in round the roots, a little water given, and then the soil pressed well up to the tree by means of the spade. He found the broadleaf wattle, sheaok, and native hobbush all did well on the swamp. Mr. Holzgreffe said at the Mount Muirhead Forest Reserve Aleppo pines could be obtained on application.

VERMIN ON PIGS.—In reply to question "How to rid Pigs of Vermin," it was advised to use kerosene, sheep dip, or insect powder. In summer time it is a good plan to have a bathing hole for the pigs, and occasionally put a tea-cup full of kerosene in the bath. A question as to intestinal worms in sheep was referred to the General Secretary. [Give half dram sulphate of iron two or three times a week and a little castor oil occasionally. Keep some nice dry wood ashes in the sties.—GEN. SEC.]

EXHIBIT.—Mr. Varcoe tabled portion of piemelon, apparently crossed with a pumpkin. The flower end had the outward appearance of a pumpkin and inside there were small open spaces.

SHEEP-STEALING.—Mr. Stewart read clipping from *Australasian* on this subject, and it was decided to discuss the matter at next meeting.

MILK FEVER.—The Chairman said he had heard several complaints about this trouble with newly-calved cows, and had come across the following remedy:—The trouble may be prevented by milking the cow for several days previous to calving, and keeping her rather short of food of a milk-producing character. If the trouble occurs through neglect of the above, the following is recommended:—Inject into the udder (through the teats) one dram of potassium mixed with one quart of boiling water, cooled down to 98° F. before being used; half a pint to be injected into each quarter of the udder. The animal should then be placed in a comfortable position on her chest and the udder gently rubbed. Her position should be changed every two or three hours, and only one injection is necessary. Before the injection is given the udder and teats should be washed with soap and water to which a little carbolic acid has been added. [In the January, 1899, issue of *Journal of Agriculture*, Mr. Alick J. Murray described a much more simple and perfectly successful way of treating milk fever. Directly symptoms are noticed, tie the head of the cow up to a beam, and give her half a bottle of brandy mixed with an equal quantity of water; repeat in about three hours, and be sure to keep the bowels open. Give 6ozs. to 8ozs. Epsom salts before the first dose of brandy.—GEN. SEC.]

OFFICERS.—Messrs R. Campbell and E. J. Harris were re-elected Chairman and Hon. Secretary for ensuing year.

Colton, June 3.

Present—Messrs. P. P. Kenny (Chairman), Jno. Shipard, W. L. Brown, M. S. W. Kenny, E. Whitehead, W. McK. Elder, W. A. Barnes, R. Hull (Hon. Sec.), and two visitors.

CONGRESS.—Mr. Brown thought some portion of the Bureau funds might be devoted to paying steamer expenses of delegates from West Coast Branches, as they got no advantage from the railway concessions granted to the Bureau. He suggested the matter should be brought forward at Congress. It was decided to consider at next meeting whether a levy should be made on the members to pay portion of expenses of sending a delegate to the Conference. Discussion took place on shipping and mail facilities of the district.

Yorke town, June 10.

Present—Messrs. J. Koth (Chairman), T. Corlett, C. Domaschensz, and J. Davey (Hon. Sec.).

WINDBREAKS.—During a discussion upon the desirableness of planting trees or tall shrubs around paddocks, to serve the purpose of windbreaks, the members present stated that they had tried various trees and shrubs at different seasons, but in most cases these had failed to grow. African boxthorn (*Lycium afrum*) appeared to thrive the best, as the cold winds which sometimes occur during summer do not cut it.

Bowhill, May 27.

Present—Messrs. J. G. Whitfield (Chairman), A. Groth, W. Towitt, W. G. F. Plummer, C. Drögemüller, J. Waters, E. Weyland, J. MacGlashan, A. Dohnt, A. Tyler, J. Gregory, H. H. Plummer (Hon. Sec.), and one visitor.

ARBOR DAY.—Arrangements to be entered upon at once for holding an Arbor Day in connection with the public school.

CONFERENCE.—It was decided to try to organise a Conference of Murray River Branches of the Bureau on a date to be fixed later on.

MARKETING PRODUCE.—Mr. Dögemüller read a paper, of which the following is a condensation :—

The farmers should combine and send their produce to town to be sold, through the Union, by auction, and get their tea, sugar, &c., through the same agency. They would gain a lot by this. They could always buy for cash, and sell their produce for cash; but in the country they could not always get cash for their goods, besides which the storekeepers give only what they please for the farmers' produce. One farmer had stated that he sent a thousand pounds of butter to town within six months, and got 4d. per pound more than was offered at Mannum. This made a difference of £16 13s. 4d.; the extra cost of sending to town was £4 1s. 9d., making an extra profit of £12 11s. 7d. For eggs he got 2d. to 5d. more per dozen than he could have got at Mannum; and it was much the same with bacon and other produce. By uniting the farmers could put their produce together to make up a good parcel to send down, and thus they would save on freights, and also secure higher prices, and receive their cash every week.

In discussion Mr. MacGlashen said that the agent for the Farmers' Union would forward all kinds of produce to Adelaide for sale.

Meadows, June 5.

Present—Messrs. J. Catt (Chairman), G. Usher, T. B. Brookes, W. Pearson, D. Tester, G. Rice, and A. Sunman (Hon. Sec.).

OFFICERS.—Office-bearers for last year were re-elected and thanked.

THE FARMER'S TABLE.—The paper on "The Farmer's Table, and What should be Grown and Produced for It," was read and discussed. Where farms are large enough wheat should be ground for flour, and the bran and pollard used for feeding live stock. Pigs, sheep, and cattle should be used for meat as well as for sale. Milk, butter, cheese, eggs, &c., should always be on the farm, and all kinds of vegetables and some fruit should be grown. The surplus in each item of produce should be sold to provide cash for articles which cannot be produced on the farm.

PROGRESSIVE WORK.—Mr. W. Pearson has just completed a reservoir on his farm which is capable of retaining several millions of gallons of water for irrigation purposes.

Mount Compass, June 10.

Present—Messrs. M. Jacobs (Chairman), S. Athurs, A. Sweetman, R. Peters, W. Wright, and H. McKinlay (Hon. Sec.).

POTATO DISEASES.—Members reported that of the alleged black-spot resisting potatoes, Hero and Silesia yielded well, considering lateness of planting. The Chairman Central Bureau wrote calling attention to notes by himself on diseases of potatoes, published in November, 1898, issue of *Journal of Agriculture*, page 351. He pointed out the likelihood of dissemination of diseases by too frequent planting in the same land, and by allowing diseased tubers to be left on the ground.

VISIT OF INSPECTION.—On June 13 the committee of the Industrial School for the Blind paid a visit of inspection to the blocks, and afterwards a public meeting was held, at which several of the visitors spoke. Mr. Molineux referred to various crops which might be profitably grown in this district, and to the system of aerial railways or telferage.

STOCK COMPLAINTS.—Mr. Jacobs reported cow suffering from weakness of the hips, the animal being scarcely able to stand. The Chief Inspector of Stock had recommended blistering the affected parts and protecting from cold. In the event of any traces of internal parasites being noticed, he advised giving a wineglassful of turps in a pint of linseed oil.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year twelve meetings were held, with an average attendance of nine members. Four practical papers had been read and discussed, a visit was paid by the General Secretary and the Inspector of Fruit, and many matters of local interest had been dealt with to the advantage of the members.

Baroota Whim, May 27.

Present—Messrs. F. H. Fluggie (Chairman), T. Simper, C. F. Bessen, A. Raneberg, and C. W. Hoskin (Hon. Sec.).

EUPHORBIA DRUMMONDI.—The Hon. Secretary read a short note on the discovery, by Dr. Jno Reid, late of Port Augusta, of "drumine," a new local anæsthetic, which is obtained from the well-known plant *Euphorbia Drummondii*. This plant has probably caused the deaths of more stock than any other plant in Australia, and, after a series of experiments, Dr. Reid succeeded in obtaining this new drug, which he considers likely to compete with cocaine as an agent for producing local anæsthesia. In his experiments with it he had good results in the treatment of sciatica; it was very useful in allaying pain in cases of sprains, &c.

SEASON.—Rainfall to May 27, 6·24in.

Calca, June 3.

Present—Messrs. A. B. Smith (Chairman), Jos. Bowman, and D. P. Thomas (Hon. Sec.).

FARMERS' RELIEF FUND.—Members were willing to assist when they were in a position to do so. Matters in connection with Congress and local business were dealt with.

Carrieton, June 15.

Present—Messrs. W. J. Gleeson (Chairman), J. B. Harrington, W. Steinke, W. H. Byerlee, A. Steinke, M. Manning, H. Menz, F. Kaerger, J. F. Fisher, and J. W. Bock (Hon. Sec.).

FARMERS' PERMANENT RELIEF FUND.—All members were in favor of the establishment of this fund, which it was considered would be beneficial to all farmers throughout the colony whenever overtaken by misfortune of any kind—such as fire, flood, drought, &c.

GRADING WHEAT.—Mr. Gleeson read a paper on "Grading, Weighing, and Selling Wheat." The following is a very short digest of his remarks:—

In 1893 he read a paper upon this subject at the Bureau Congress in Adelaide, and in 1895 read a similar paper at a Conference of Branches at Quorn. But very little alteration had since been made, although most of the members were agreed that such was urgently needed. The Farmers' Union were now making an effort to grade wheat into three different qualities, and stacking each grade separately; but were making the mistake of not paying a higher price per bushel for the wheat which exceeded the standard. If this were done, it would bring about an improvement in the general average quality of South Australian wheat, increase the demand for the best quality, and probably induce merchants in Europe to send out purchasers, as they do for our wool. If only a farthing per pound extra were given for the highest quality of our wheat, it would encourage farmers to produce such quality. At present, if wheat weighing 67lbs. per bushel is taken to grist, the miller will deduct 2lbs. for waste, and charge for grinding the wheat, although this quality of grain will give a greater quantity of flour than can be got from lighter wheat. The farmer taking in a load of clean heavy wheat gets no more for it than is given for a load of light grain well mixed with oats, drake, and barley. There should not be such a heavy reduction on wheat weighing below the

standard average fixed annually by the corn trade section of the Chamber of Commerce. The deduction might be $\frac{1}{4}$ d. for 1lb. under standard, $\frac{1}{4}$ d. for 2lbs., and 2d. for 3lbs., and extra allowance on the same scale for every pound over the standard. If a large shipment of first-class wheat were gathered at any of the leading ports, and the Agent-General had samples forwarded him, it might be the means of bringing more competition against our local buyers. If the Farmers' Union were to adopt that principle, it would be better than running the risk of shipping, and it would be an immediate assistance to the farmer. Then, in regard to bags, they cost 5d. each, and the wheatbuyer pays for them, weighed in as wheat, only $1\frac{1}{4}$ d., and, as they doubtless get a profit of $\frac{1}{4}$ d. per bag on first sale, the wheatbuyer makes a clear profit of $\frac{1}{4}$ d. per bag, or £8 17s. 1d. on 500 bags of wheat purchased. He hoped that these matters would be well discussed by all the Branches of the Agricultural Bureau.

Members fully agreed with the writer on most of the points. They thought that farmers should oppose the system of weighing in bags as wheat.

ARBORICULTURE.—Several members reported that they had only small success in growing forest trees last season, owing to ravages by locusts and prevalence of drought; but they will plant again during the present season.

Amyton, June 15.

Present—Messrs. Jos. Gum (Chairman), Jno. Kelly, H. Gray, H. Turner, W. Gum, W. Hawke, Thos. Gum, A. Stone, and S. Thomas (Hon. Sec.).

OFFICERS.—The Chairman and Hon. Secretary were thanked for their services and re-elected for ensuing year.

FARMERS' RELIEF FUND.—It was resolved that the establishment of a permanent relief fund was not desirable.

PEST.—Mr. Turner tabled samples of caterpillars attacking gums and pepper trees in the district. To be forwarded to General Secretary. [Larva of click beetle or jumping jack; also another beetle and a caterpillar. Not possible to identify the two last.—GEN. SEC.]

SEED DRILL.—Considerable interest was taken in offer by Mr. Turner to purchase a seed drill, for hire to members and others, if sufficient inducement was offered. Several members agreed to accept Mr. Turner's offer, to give the system of drilling in seed a trial in this district.

Dowlingville, May 29.

Present—Messrs. R. A. Montgomery (Chairman), T. Kenny, S. Tee, G. Inkster, H. Crowell, F. Roberts J. Phelps, R. Willing, J. Burkin, G. Mason, J. L. Broadbent (Hon. Sec.), and two visitors.

TUBERCULOSIS.—This subject was discussed, and members were of opinion that additional stock inspectors should be appointed, as the disease probably existed in many quarters where the owners of the stock were unable to detect it.

STANDARD BUSHEL.—The Branch favors the adoption of two standard grades for wheat, but at the same time the standard should be high. This would enable us to recover our name for high quality wheat, and give the farmer who produces a good sample the benefit of a good price. Merchants should pay more for the best sample to encourage good cleaning, and should also refuse to purchase dirty samples. At present the careful farmer is the sufferer, and the system is a distinct encouragement to the production of a low average sample. It was proposed and carried that in the opinion of the Branch the standard for No. 1 standard should be 65lbs. per bushel and No. 2 62 $\frac{1}{2}$ lbs.

OFFICERS.—Mr. Montgomery was re-elected Chairman and Mr. F. Roberts elected Hon. Secretary for ensuing year. A vote of thanks was accorded to retiring officers, also to Mrs. Montgomery for entertaining the members, the meeting being usually held at the Chairman's residence.

Cherry Gardens, June 13.

Present—Messrs. R. Gibbins (Chairman), T. Jacobs, C. Lewis, J. Lewis, G. Hicks, J. Choate, G. Brumby, and C. Ricks (Hon. Sec.).

POULTRY.—Mr. Gibbins reported that his young ducks, when about half grown, lost the use of their legs and were unable to walk. He had tried new stock, but with similar results.

HAND-THRESHED V. MACHINE-THRESHED SEED.—Mr. J. Lewis stated that he had sown, side by side, wheat threshed by hand and by machine, equal quantities of each. The portion sown with hand-threshed seed was quite twice as thick as the other, although he could not by examination detect any cracked grains in the latter. It was agreed that if all machine-threshed wheat was similarly injured, the use of such wheat for seed was a great loss to the country. Members think it will pay farmers to hand-thresh the portion of the crop required for seed.

Stockport, June 19.

Present—Messrs. T. Megaw (Chairman), D. G. Stribling, C. W. Smith, J. Smith, S. Smith, J. Smith, jun., M. Connolly, P. Hogan, and J. Murray (Hon. Sec.).

STOCK COMPLAINT.—Mr. C. W. Smith reported that one of his cows was taken ill, and appeared to be in great pain, lifting first one and then the other hind leg under the belly. He gave her a tablespoonful each of ground ginger and carbonate of soda in a pint of warm water in the evening, repeating the dose next morning, with beneficial effect, the animal being now all right.

ANNUAL REPORT.—The Hon. Secretary's annual report showed that during the year eleven meetings were held with an average attendance of over nine members and 3·8 visitors. This was better than last year, but he considered there was still room for improvement. It was unfair to members who went to the trouble to prepare papers to read to have only a small attendance. It was decided that the rule re non-attendance be more strictly enforced. Messrs. G. Burdon and D. G. Stribling were elected Chairman and Vice-chairman respectively, and Mr. J. Murray was re-elected Hon. Secretary, and a vote of thanks accorded to officers for past services.

ANNUAL PICNIC.—The question of having an annual picnic or social gathering in connection with the Branch was discussed, decision being adjourned till next meeting.

Lyrup, June 13.

Present—Messrs. T. Nolan (Chairman), P. Brown, T. R. Brown, A. Menzies, D. J. Till, A. Pomeroy, and W. H. Wilson (Hon. Sec.).

POTATOES.—Mr. Menzies tabled samples of potatoes for identification. Members wished to know whether potatoes sent to Central Bureau could be identified. [Unfortunately the diversity of opinion as to names is so general that this cannot be done satisfactorily—GEN. SEC.] One variety, called Pink Hebron, was very prolific. A dark-red potato, supposed to be Beauty of Hebron, was exceptionally large and sound, and yielded well. Mr. Menzies stated that the land on which the potatoes were grown had carried two crops of wheat, and was ploughed up on January 14 and watered. Potatoes were planted on 21st and 28th, 6in. deep, in every third furrow, 28in. apart; showed up on March 9, and were then cultivated, leaving a shallow drill for irrigating; watered March 14, cultivated again on 18th, drill left for watering on April 14; cultivated once more on April 17, and a few early tubers were

dug on April 20; mature and harvested on June 12, yielding 3 tons per acre, or nine to one. Mr. Menzies showed potatoes infested with worms; he had tried several treatments to destroy them, but failed.

COW PEA.—Mr. D. J. Lee said the cow peas sent from Central Bureau had been a great success with him; only irrigated twice and had yielded heavily, some of the pods being over 1ft. long. The White was the best, Whip-poor-Will next, followed by Black and Clay-color. The beans are very nice if taken young and cooked like kidney beans.

DROUGHT-DISTRESSED FARMERS' FUND.—Members decided to collect and forward subscriptions to the committee.

Naracoorte, June 10.

Present - Messrs. O. Hunt (Chairman), H. Buck, G. Wardle, J. D. Smith, S. Schinckel, E. C. Bates, and D. McInnes (Hon. Sec.).

OFFICERS.—Messrs. S. Schinckel and G. Greenham were elected Chairman and Hon. Secretary respectively for the ensuing year, a vote of thanks being accorded to the retiring officers.

AGRICULTURAL SHOWS—A discussion on this subject took place. Mr. Baker thought there was too much repetition, and fewer local shows would be better. Mr. Hunt did not think the present system could be bettered. Small as the country shows were, they were educational, and it was unfair to draw comparisons between the local and the Adelaide shows. Mr. Baker thought one show for the South-East, to be held in different places each year, would be better, and enable larger prizes to be offered than under present conditions. Mr. Schinckel said this system was tried in the Wimmera, but did not last long. Mr. Smith pointed out that a large plant would be required for a united district show, and it would not pay to hold it annually at different places. Mr. Johnson said, when the shows were first started the townships were in a primitive condition, and there were no ready means of communication between them. These shows were still continued, but, as a whole, he believed they were run at a loss, and that he believed it would be better to have one general district show.

Pyap, June 16.

Present—Messrs. W. Axon (Chairman), C. Billett, J. Harrington, T. Smith, C. E. Coulls, G. Napier, H. C. Mills, A. J. Brocklehurst, J. Bowes, B. T. H. Cox, and W. C. Rodgers (Hon. Sec.).

SHOW AND CONFERENCE.—No arrangements could at present be made with Swan Reach *re* combined show, nor with Bowhill *re* Conference of River Branches.

SWEET POTATOES.—Mr. Brocklehurst tabled a sweet potato grown on Pyap, weighing 4lb. 3oz.

Penola, May 13.

Present—Messrs. J. Fowler (Chairman), L. W. Peake, J. A. Riddoch, J. W. Sandiforde, W. Miller, D. Balnaves, D. McKay, E. A. Stoney, F. Ockley, and R. Fowler (Hon. Sec.).

EXHIBITS.—By Mr. J. A. Riddoch, Rome Beauty and other splendid apples, grown at Coonawarra fruit colony. By Mr. D. McKay, very fine Purple-top turnip, grown at Monbulla, on a swampy flat where no grass ever grew, but

now, with turnips, will fatten at least fifteen sheep to the acre. There are hundreds of acres of similar country in this district.

COW PEA.—Mr. Balnaves and Mr. Miller said the seeds germinated, but the plants did very badly.

RAINFALL.—Mr. E. A. Stoney, for Coonawarra, reported rainfall from June 10 to December 31, 1898, at 17·99in., and from January 1 till April 30, 1899, at 6·385in.

WEEDS.—Resolved to request that a species of *Kentrophyllum*, almost identical with *K. lanatum*, but bearing a purple flower, and *Centaurea melitensis* (cockspur) be declared noxious weeds within the meaning of the Act.

CROWS.—Dr. F. Ockley said he was very much interested a short time ago in the proceedings of a large flock of crows, which were digging and devouring great numbers of large grubs which do considerable damage. He was of opinion that the crows should not be destroyed.

CODLIN MOTH.—Mr. E. A. Storey said that this district is at present quite free from codlin moth pest; but unless stringent measures are taken to prevent its introduction, the day is not far distant when it will be as prevalent here as in the localities north and southwards. The greatest danger was to be apprehended from returned empty fruit cases. A committee was appointed to consider this matter.

OFFICERS.—Captain Fowler was re-elected Chairman, and Mr. R. Fowler as Hon. Secretary.

SUBJECTS FOR DISCUSSION.—The following subjects were suggested for discussion by the Branches:—(1) The importance of agricultural teaching in public schools; (2) Is the pollination of flowers of fruit trees by insects or otherwise retarded or prevented by spraying with poisonous compounds?

Penola, June 10.

Present—Messrs. J. Fowler (Chairman), S. B. Worthington, J. T. Morris, J. D. Wilson, W. Miller, L. W. Peake, D. McKay, J. W. Sandiforde, H. Ricketts, E. A. Stoney, E. McBain, F. Ockley, and R. Fowler (Hon. Sec.).

FORMAL BUSINESS.—A considerable amount of formal and local business was got through, including arrangements for prevention of introduction of codlin moth, and protection against late frosts.

HORTICULTURAL INSTRUCTOR.—It was resolved to ask the Hon. Minister of Agriculture to appoint a horticultural instructor, in accordance with resolution adopted at the latest Conference of the Bureau in Adelaide.

ARBORICULTURE.—It was decided to ask the district council to initiate a system of tree-planting in the district.

Koolunga, May 25.

Present—Messrs. T. B. Butcher (Chairman), R. H. Buchanan, R. Palmer, W. J. Jose, W. T. Cooper, J. Button, E. J. Shipway, J. Butterfield, J. Sandow, J. Jones, R. Jackson, R. Laury, G. Pennyfield (Hon. Sec.), and two visitors.

QUESTION BOX.—The following answers were decided upon by the members:—We favor grading wheat as is done in America. The Farmers' Union should receive greater support than is at present accorded. Farming cannot be made to pay when wheat sells at only 2s. 6d. per bushel. Depth of fallowing depends upon the soil; and, as a rule, new land requires shallow ploughing, and old land deeper. In answer to "What are the symptoms of tuberculosis?" the Hon. Secretary read part of a circular dealing with the matter.

Forster, June 29.

Present—Messrs. A. Johns (Chairman), F. Towill, C. Bolt, J. Sears, J. Retallack, F. Johns, A. Retallack, A. G. Prosser, J. D. Prosser (Hon. Sec.), and seventeen visitors.

SEED EXPERIMENTS.—Mr. A. Prosser has one plant for four seeds of *Cytisus palmensis* (Tagosaste), doing well. Three members have Bartlett's Crossbred and Cuban King wheats doing well.

HORSES.—Members are agreed that medium light draught horses are best for farm work.

RABBIT DESTRUCTION.—Good results were recorded from use of wire-netting traps. A recipe for what appears to be "toxa" was given by a member—strychnine and apple jam—but the proportions were not mentioned. Another spoke of wheat, phosphorus, and sugar as being effective.

OFFICERS.—The Chairman, Vice-chairman, and Hon. Secretary were thanked and re-elected.

Mount Gambier, June 10.

Present—Messrs. J. Watson (in chair), G. G. Collins, J. C. Ruwoldt, W. Barrows, J. Dyke, A. J. Wedd, M. C. Wilson, and E. Lewis (Hon. Sec.).

PASTURES.—Mr. Dyke offered use of plot of ground for experiments with pasture grasses under the direction of the Dairy Instructor. Some discussion ensued on the value of various grasses, and it was agreed that experimental work in this direction had not been neglected by the members. Differences of opinion exist as to value of Bromley (Brome) grass, some calling it a nasty weed, and going to some trouble to get rid of it, and others classing it as a very valuable grass on light soils. A specimen of saltbush was tabled, and some discussion ensued on the value of saltbush in this locality. It was stated that stock would not touch the bushes when there was any grass about, and it was thought the salty constituent required to make it of value for stock was lacking in their soils.

POTATOES.—Mr. Ruwoldt promised report on experiments with new varieties of potatoes. Discussion ensued on the deterioration of the potatoes grown in the district, and the necessity for obtaining improved varieties. It was mentioned that Tasmanian potatoes were fetching £1 per ton more in Adelaide than Mount Gambiers, owing to superior quality of the former.

Dawson, June 17.

Present—Messrs. R. Renton (Chairman), C. F. W. Just, T. Weatherill, and A. F. Dempsey (Hon. Sec.).

FIELD TRIAL.—Discussion took place on field trial of implements which was held on May 22. It was generally agreed that the ploughs shown by Mr. Heithersay were light of draught, but did not cut or turn the furrows satisfactorily, which more than counterbalanced the former advantage. This opinion was also freely expressed at the trial. Mr. P. J. Byrne showed two three-furrow ploughs, and, although not so light of draught, did their work to the satisfaction of those present. Unusual interest was manifested in the trial, over sixty farmers being present, but regret was expressed that no dynamometer was available to test the draught of the ploughs.

FALLOWING.—The Chairman asked members to come to next meeting prepared to give particulars of the way they worked their fallows, from ploughing to seeding, and also to report after harvest returns from the fallow crops.

He noticed nearly every farmer in the district had a different system of treating the land, both during spring and at seedtime, and believed much good would result from comparison of results from the different practices. Mr. Just considered it impossible to lay down a general rule that would always work to advantage, as so much depended upon the rainfall of each season.

Angaston, April 26.

Present—Messrs. J. E. Swann (Chairman), F. Salter, M. Andrew, A. Salter, W. Sibley, S. O. Smith, R. Player, J. Vaughan, and E. S. Matthews (Hon. Sec.).

PHYLLOXERA.—The sub-committee appointed by the Branch to consider matter—Phylloxera Bill—with delegates from Tanunda and Nuriootpa reported on work done.

CONFERENCE OF BRANCHES.—Question of holding a Conference of Northern Branches at Angaston was dealt with, and sub-committee reported having made application to the local Agricultural Society for space at their forthcoming show for exhibits of members.

EXHIBITS.—The Hon. Secretary tabled choice collection of chrysanthemum flowers, and Mr. Player a splendid specimen of cowpea.

AGRICULTURAL SHOWS.—At previous meeting the Hon. Secretary read a paper on this subject. In the main he agreed with the address given by Professor Lowrie at Congress. The paper was well discussed, members agreeing that good would result from the consideration of the matter suggested by the Professor.

Angaston, May 23.

Present—Messrs. J. E. Swann (Chairman), R. Player, S. O. Smith, E. Thamm, W. Sibley, A. Friend, W. Sage, F. Thorne, A. Salter, A. Sibley, P. Radford, M. Andrew, J. Vaughan, and E. S. Matthews (Hon. Sec.).

PAPER.—Mr. A. Salter read a very interesting paper on a recent trip to Mount Gambier, and showed a number of interesting photographic views of places visited.

SOCIAL.—The Chairman invited members and their wives to a social gathering at his residence. Mr. S. O. Smith invited members to inspect the Yalumba Vineyards. Both invitations were cordially accepted.

FARMERS' RELIEF FUND.—The Branch cannot support proposed permanent fund.

TAGOSASTE.—The Hon. Secretary supplied well-grown plants of the true tagosaste (*Cytisus palmensis*) to members.

CODLIN MOTH.—A sub-committee was appointed to take necessary action to protect the interests of the district in connection with agitation for repeal of codlin moth regulations.

Minlaton, June 24.

Present—Messrs. H. Boundy (Chairman), W. Correll, A. McKenzie, J. McKenzie, J. Martin, S. Vanstone, J. H. Ford, R. Higgins, D. G. Teichelmann, M. Twartz, Jos. Correll (Hon. Sec.), and four visitors.

FERTILISERS.—The Hon. Secretary read correct analysis of Acme fertilisers, which is manufactured at Edithburgh and has been sold in large quantities to farmers on Yorke's Peninsula. It contained 0.3 per cent. of soluble phosphoric acid, 6.2 per cent. of insoluble phosphoric acid, and nitrogen just over 1 per cent. Crude gypsum formed 40 per cent. of the bulk of the fertiliser.

The Hon. Secretary pointed out that as a phosphatic manure it compared very unfavorably with mineral super. 18 per cent. phosphoric acid, nearly all soluble, or Thomas phosphate 17 to 19 per cent. phosphoric acid. He believed gypsum could be purchased for about 4s. per ton, and there was no necessity to pay a much higher price for it in a fertiliser. Several members stated they had tried this Acme fertiliser alongside other fertilisers, and the growth of the crops up to the present was decidedly against the Acme fertiliser. It was unanimously resolved—"This Branch is of opinion that the Acme fertiliser is unsuitable for Yorke's Peninsula, being almost destitute of soluble phosphoric acid." Mr. W. Correll stated that he mixed wheat with Ohlendorff's super, the latter being too sticky to run through by itself, and the mixture running through the manure feed alone there was a saving of draught. The result was, however, disappointing, as the ground put in this way had to be resown. Members thought the excess of sulphuric acid in the fertiliser was responsible for the trouble.

ARBOR DAY.—Resolved, that all members who can make it convenient to do so will attend arbor day celebration in Minlaton, on July 18. It was also resolved to assist in establishing a chrysanthemum show for juveniles.

RAINFALL.—Mr. Higgins reported 2.25in. rain recorded for June to 24th; total to date, 6.57in.

BUREAU MEETINGS.—Mr. Higgins read a paper on "How to Improve the Meetings of the Branch," as follows:—

Agriculture, I take it, means the science of cultivating the ground. Now, no one can master any science without close application, study, and observation. Scientific students usually have associations and hold meetings where they can discuss matters of vital importance to their progress in the knowledge of their profession. While students of other sciences are meeting together and discussing knotty problems met with in their studies, our Government very wisely has inaugurated what is known as the Agricultural Bureau, of which we are a Branch. I fear many members do not appreciate this boon as highly as they ought. Farming in South Australia is not now what it was years ago, when any simpleton could scratch the ground and get a good crop, and afterwards reap two good self-sown crops. Now to be a successful farmer requires more brains and energy than to be an ordinary politician. The title of my paper, "How to Improve our Meetings," presumes there must be room for improvement. Some of our Branches, I fear, are not as successful as they might be, and as I venture to predict they would if a different system was adopted. At present we find, in many cases; the bulk of the work and nearly all the thinking is left to the Secretary and one or two members; the others come along to the meetings and ask "Well, what has the Secretary got for us to-day?" They attend with minds, as it were, a perfect blank, ready to hear whatever may be prepared for them, but never, even by accident, do they contribute a single idea to the general fund of instruction. There was a man who occupied the chair of a Branch for one year, and though closely observed he was never known to introduce one item for discussion; his usual share in the proceedings was to take his seat and call on the Hon. Secretary to bring forward the business for the day; this kind of thing makes it very rough for any Hon. Secretary, however energetic and enthusiastic he may be. The Hon. Secretary deserves the hearty support of all members, and not, as in some cases, their ridicule when a new idea is introduced. Any member (and we meet with one occasionally) who thinks he knows everything should at once resign and make room for a learner, for I find the greatest thinkers are ever ready to own their ignorance and to learn from others. My idea is that our programmes should be arranged at least a month in advance, and the subjects announced. Each member should feel it a point of honor to take his turn at introducing the principal subject for discussion, and this he should be well prepared to do owing to having had the subject well thrashed out in his home circle. The other members, knowing the matter for discussion, should also talk it over at home, and come well primed to present to the meeting the concentrated thought of the best intelligence in each homestead. Should any member not feel equal to opening a discussion or reading a paper to form the bulk of the day's business, surely among the varied and fascinating branches of agriculture with which he is daily in contact he should be able to store away some observations and make it a matter of duty to report those observations for the benefit of other members; if he cannot do this he is a drone in the hive, and should resign and make way for a worker. Members should consider it a great privilege to belong to the Agricultural Bureau, not as one I heard of, whose sole desire to join the Bureau was to get a free copy of the *Journal* and to obtain vegetable seeds without paying for them; fortunately his name was rejected. Regular attendance, and punctuality are essential to

success in this as in every other effort at self-improvement; also I would urge each member to bring an intelligent friend with him to the meetings. "As iron sharpeneth iron so does the countenance of a man his friend"; this being the case let us get as many countenances as we can, for some of us sadly need sharpening. To conclude, let me remind my fellow members that the Agricultural Bureau offers advantages which, if properly appreciated and made use of, will produce solid and lasting benefits to the district and to the colony generally, and will materially help to put South Australians in the very forefront of scientific agriculturalists.

Some discussion ensued, members generally agreeing with the main points of the paper. Mr. J. D. Mayer (visitor) said members were often liable to think that something which they may have observed in their work was too trivial to be reported, whereas, if brought forward at the meetings, it might very probably prove of great value to someone.

BUNT-PROOF WHEAT.—The Hon. Secretary wished to know if a member of any of the Branches had observed bunt in Medea wheat. He was endeavoring to raise a wheat proof against bunt, using Medea as one of the parents. He had selected a head of Medea wheat from a crop, and from the seed many variations were produced. He had selected eleven of the most promising; they were all more or less beardless; some were solid in straw, some had grain like Medea, and others fairly good milling grain and semi-solid straw. He would like the opinion of members of other Branches as to whether it was practicable to raise a bunt-proof wheat.

Brinkworth, June 16.

Present—Messrs. S. Auger (in chair), J. F. Everett, J. Graham, W. Wundke, A. R. McEwin, A. W. Morrison, R. Cooper, W. H. Pearce, J. Stott (Hon. Sec.), and two visitors.

JUDGING AT SNOWS.—Paper by Mr. R. Cooper on this subject was read and discussed. The majority favored single judges, principally because a competitor could then have the defects of his exhibit pointed out to him: whereas, with plural judging, the responsibility was shifted by one judge to another.

RAINFALL.—June rainfall, to 24th, 2·24in.

Riverton, June 24.

Present—Messrs. H. A. Davis (Chairman), D. Kirk, M. Badman, F. M. Calf, H. A. Hussey (Hon. Sec.), and two visitors.

PRUNING OF FRUIT TREES.—On June 7th Mr. Geo. Quinn gave practical demonstrations at Mr. Gravestock's garden in the pruning of fruit trees.

PAPER.—Mr. Kirk read paper on "Fixing the Type," reprinted from *Farmers' Advocate*. In moving a vote of thanks to Mr. Kirk the Hon. Secretary urged members to bring with them to the Bureau meetings cuttings from papers containing any information of value. Although they might not call for much discussion there was always something to be learnt from the observations of practical men. Mr. Davis agreed. He pointed out that uniformity of stock was a great essential, especially if the animals are reared for sale, as the price bid or paid was usually the proportionate value of the worst animal in the pen.

EARLY FALLOW.—Mr. Davis was pleased to note that so many farmers were doing their fallowing immediately after they had finished seeding, instead of waiting till August or September. If the scarifier is run over the fallow early in April to break down the clods, the oats and other weeds will soon start, and by ploughing them under before seeding the land is manured and the crop kept free from weeds.

Woolundunga, May 30.

Present—Messrs. J. H. Michael (Chairman), G. Lewis, J. G. Moseley, J. Grunike, H. Aldenhoven, N. J. S. Rogers, F. A. Sells, N. Rogers (Hon. Sec.), and one visitor.

CONGRESS.—The subject of "Uniformity of Fruit Cases" was suggested for discussion at the forthcoming Congress.

OFFICERS.—Mr. H. Aldenhoven was elected Chairman and Mr. N. Rogers re-elected Hon. Secretary for ensuing year. The officers were thanked for past year.

TREE-PRUNING.—The Inspector of Fruit (Mr. George Quinn) visited the district, and gave some very practical demonstrations in the pruning of fruit trees, the gardens of Messrs. Rogers and White being visited. Representative from Davenport Branch and residents interested in fruit-growing were present, in addition to members of the Branch. In the evening Mr. Quinn gave an instructive lecture on "Cultivation of the Soil."

Balaklava, June 10.

Present—Messrs. P. Anderson (Chairman), A. W. Robinson, W. Crawford, J. Mills, W. H. Thompson, G. Reid, W. Smith, E. Hains, and E. M. Sage (Hon. Sec.).

OFFICERS.—Mr. P. Anderson was elected Chairman and Mr. E. M. Sage re-elected Hon. Secretary for ensuing year, a vote of thanks being accorded to officers for services during past year.

PEAS AS A MANURE CROP.—Mr. A. W. Robinson read a paper on "The Peas as a Nitrogenous Fertiliser," to the following effect:—

As was well known, the pea, with other members of the natural order Leguminosæ, have the power during their growth of abstracting nitrogen from the atmosphere and storing it in the soil. If the roots are examined there will be found small nodules containing bacteria living to a certain extent on the plant, and in their vital processes taking up the nitrogen from the air and leaving it in the soil as a salt of nitrogen. It is evident that the practice of adding phosphates to the soil is not always going to produce good crops of grain, especially on small holdings where the land cannot be spelled. Sooner or later the practice will lead to the exhaustion of the nitrogen, which is essential to the production of the crop, and it was for this reason he wished to speak of the pea as a nitrogenous fertiliser. Purchasing nitrogen in fertilisers costing £11 to £12 per ton was very different from obtaining phosphates at £4 to £5. Not that he would advocate growing peas on an extended scale. By cultivating twenty acres to thirty acres annually, and never the same piece of land twice in succession, a great deal of benefit would result. He had grown the pea in this district with a fair amount of success, and found the pasture much improved. This year they were putting more under crop with peas. He found they like a light soil with a good proportion of lime in it, though they often thrive on fairly stiff soil. The land should be fairly consolidated, and for this reason deep ploughing is a disadvantage. June is the best time to sow. If earlier there is the liability to frost cutting them when whilst blooming, and if later they feel the effects of dry spring weather. About 1½ bush. to 2 bush. of seed per acre should be drilled in, in rows 14 in. to 16 in. apart. A dressing of 1 cwt. super. per acre will be found advantageous. If the crop is intended for silage sow a little barley with it. It will act as a support to the pea, and there will be less liability to cut the pods and allow the peas to shed when harvesting. He had seen beautiful ensilage at Roseworthy College made from a mixture of peas and barley. If for seed, the peas are harvested by means of the horse rake, and then trodden out by horses or other means; but in raking a good deal of the seed was left on the ground. Pigs turned into the paddock will pick up these. He would advise gathering the crop whole and feeding to the pigs, fine streaky bacon resulting. In regard to yields, in 1883 Mr. E. Wood, of Dalky, broadcasted a bag of seed over three acres, cut the crop, and trod it out with horses, cleaning up thirteen bags of seed. This was of course a very satisfactory return. Early Dun was probably the best variety, and buyers should insist on small seed, as the drill cracks a good number if too large. By growing peas as suggested he considered the farmer would "kill two birds with one stone," i.e., enrich the land in the all-important element nitrogen and obtain revenue in doing so.

Mr. Hains harvested peas with the binder by taking off the tying gear and throwing them from the carrier in heaps. If the carrier is not suitable it is easy to adjust one. Mr. Anderson said they got good crops of peas in the early days, the haulms being sometimes as much as 14ft. in length. They were cut with the scythe, carted to the stockyard, and trodden out by horses. Put an unmanageable colt to the work for a day and he is easily handled by nighttime.

Port Lincoln, June 16.

Present—Messrs. W. Laidlaw (in chair), J. D. Bruce, G. Dorward, Jas. Telfer, J. St. J. Puckridge, E. Chapman, R. Sullivan, W. E. Goode, J. Anderson (Hon. Sec.), and several visitors.

CHAIRMAN.—Mr. S. Valentine tendered his resignation as Chairman, as he was leaving the district. A vote of thanks was accorded to Mr. Valentine for his valuable services to the Branch. Mr. Walter Laidlaw was appointed Chairman.

FARMERS' RELIEF FUND.—After a lengthy discussion it was resolved—"That this Branch does not favor the establishment of a permanent relief fund."

BEE MOTH.—Mr. Puckridge asked if there was any cure for bee moth. Mr. Goode said the only thing to do was to burn the infested hives and everything connected with them. With great care it was possible to keep the pest out of the hives. [Such drastic treatment is only necessary with the old-fashioned hives. In bar-frame hives, by keeping the colonies strong, and removing the frames now and then and destroying any of the grubs found, the pest can be kept under.—GEN. SEC.]

WEEDS IN CHAFF.—Mr. Bruce brought under notice the fact that chaff which there was reason to believe was infested with star-thistle was being imported into the district. Farmers and others were advised to be particularly careful to destroy any plants of same should they appear.

LUCERN.—Mr. W. T. Mortlock gave his experience of lucern cultivation at Martindale, and considered that much of the land about this neighborhood was suited to the growth of this plant.

Riverton, May 27.

Present—Messrs. H. A. Davis (Chairman), W. Hannaford, T. Gravestock, D. Kirk, J. Kelly, F. M. Calf, H. A. Hussey (Hon. Sec.), and one visitor.

OPHTHALMIC DISEASE IN CATTLE.—Hon. Secretary reported that some cattle near Riverton were suffering from a disease of the eyes, causing intense pain, and in some cases resulting in the bursting of the eyeball. [Possibly due to "blood fungus," and needs personal attendance of a veterinary surgeon.—GEN. SEC.]

FORESTRY.—Mr. W. Hannaford read the following paper:—

For some weeks the subject of forestry has been given some prominence in the daily papers, and for years past the planting of trees has met with considerable public and individual favor. That this is the case is only natural, seeing that South Australia, of all the Australian colonies, is the worst off for natural forests and has been dependent for years on the sister colonies for its supply of timber. The question arises—is it worth our while preserving what few forests we have? If it is, are the benefits sufficiently apparent to warrant expenditure in extensive tree planting? I certainly think there are sufficient reasons why, as a colony, we should do so. This colony is subject to great variations in temperature and rainfall, and healthy as the colony undoubtedly is, it could often be more comfortable to man and beast physically, and to the former, at least, financially without in any measure detracting from its healthiness. The bleak cold winter's winds and the hot blasts of the summer might be toned down and checked

in their destructiveness to crops and gardens. With regard to timber for public works we have to go outside of the colony for that which might easily be produced in the colony by small expenditure, and the timber for fencing and other public and private works must be provided by some means. The value of our hardwoods for purposes where great durability is required is beyond doubt, and compares very favorably with timber imported from other colonies. For domestic purposes, being without coal or other natural heating resources, firewood must of necessity be an important item. Then there is the very important wattle and olive oil industries. The former is, and possibly the latter will prove sufficiently remunerative to encourage the planting on an extensive scale of the wattle and olive by private individuals. Our edible scrub, such as the sheoak and mulga, must, unless grown in protected areas, become less every year. In our own district it will not be many years before the sheoak disappears altogether, excepting in cemeteries or other protected spots, and the mulga of the North is gradually but surely getting thinned by sheep and rabbits. The extension of our bee culture, and the protection of our birds, might well be classed as one of the direct profits of tree-planting; for honey is a valuable exportable article, and birds, by destruction of insects, &c., contribute very materially to keeping garden pests in check. Nature having provided us with forests, so scant as they may be, it behoves us as a community to see to it that we leave to posterity a forest inheritance, not only equal, but superior to what we now possess. The growth of trees, in comparison with our own lives, is so slow that the following generations will naturally reap greater benefit than the generation that plants. To this fact may be attributed, in a large measure, the amount of indifference to planting by private individuals. Another cause is that a large section of the community are tenants, which kind of occupation provides no encouragement to improve or beautify by planting. Therefore, it is a work that of necessity is or should be a national one. I notice by the papers that there are 217,189 acres of Crown lands set apart for forestry purposes; some of this, it appears, is unsuitable for trees, and is to be let for grazing. During the last twenty-two years, up to 1897-8, about £140,000 had been spent, and the returns from the forest lands, in one way and another had been about £125,000, leaving a balance of expenditure over income of about £15,000. When we consider that most of the planted trees are not yet sufficiently grown to be of commercial use, the Forestry Department is one of the best departments in connection with our public enterprise, and, no doubt, in future years only such trees as are suited to soil and climate will be planted, thereby saving time and expenditure on unremunerative labor. During the last ten years we have imported palings and hardwood to the value of £126,000. Probably the colony is capable of growing nearly all the hardwood required; but unless planting is gone in for extensively, our expenditure on imported timber must yearly increase. How can we increase our forests? I believe it will be necessary to proclaim large areas of the public estate forest reserves, to be let on lease for grazing and other purposes, subject to resumption for planting purposes as State finances permit. Perhaps it would be a good way to secure to futurity the blessings of the sinking fund, if it was used for tree-planting purposes. The preservation of our present State forests; the encouragement by local government bodies to assist in getting impassable roads planted, and roadsides especially, where watertables are apt to wash into deep gullies. In many places the land enclosed by our railway fences could be planted, providing in years to come sources for railway repairs, &c. How is the interest in this subject to be increased? One way, I think, would be to form in all centres of population forestry committees, the members of which could deliberate on the best means of forwarding the movement, invite subscriptions, evoke assistance of district councils, solicit the assistance of the churches to raise funds to beautify our church lands, and make our cemeteries beauty spots instead of dreary wildernesses, encourage the young by making Arbor Day of greater importance to them, establishing depôts in every township, where orders can be received and trees brought from the Government nurseries at stated intervals to fulfil those orders, and last, but not least, good example.

. RAINFALL.—For May, 2.30in.

Morgan, June 17.

Present—Messrs. J. Jackman (Chairman), A. Stubing, C. F. W. Pfitzner, A. Dennis, H. Hahn, and J. Wishart (Hon. Sec.).

FEEDING DOWN CROPS.—Several members reported early and self-sown crops too forward, some almost to heading. Discussion ensued on the advantage or otherwise of feeding off with stock. The opinion of the majority was that feeding off by sheep was right; but where only large stock is kept it would be a doubtful advantage to put them on to the crop to feed it off.

WHEEL NAVES.—Mr. Dennis tabled nave of wheel made from native box, of excellent quality.

Paskeville, June 17.

Present—Messrs. H. F. Koch (Chairman), A. Goodall, J. C. Price, A. C. Wehr, J. Bammann, F. Bussenshutt, G. Miers, A. Palm, J. H. Nankervis, and W. S. O'Grady (Hon. Sec.).

OFFICERS.—Mr. A. C. Wehr was elected Chairman, and Mr. W. S. O'Grady, Hon. Secretary.

TAGOSASTE.—Members reported that seeds of *Cytisus palmensis* (true Tagosaste) came up very freely, but the frosts seemed to affect the plants badly.

BEST TIME TO CUT HAY.—Mr. Price contended that horses do best when fed on hay that was cut when the crop was turning brown. The Chairman advocated cutting hay just after the flowers have fallen, as the hay then contains more sugar, oil, gum, starch, and aroma, and the horses relish it right up to the butt.

Quorn, June 22.

Present—Messrs. R. Thompson (Chairman), J. B. Rowe, James Cook, J. Rock, J. Johnson, W. Toll. H. Porter, H. S. Stacey, and A. F. Noll (Hon. Sec.).

PROFIT IN PIGS.—Discussion on this subject was resumed from previous meeting. Members concluded that, if pigs were fed in a sty from birth till maturity, they would cost more than they were worth. They should be fed upon greenstuff when young. This should be purposely grown for them on a well-manured piece of land in a favorable place which could be overflowed if possible. Attention should be directed to the securing of the earliest-maturing breed of pigs and to getting the litters at the proper time, when there is plenty of green feed about. Success in the sale of bacon and hams lies to a great extent in the make-up of the article. Even if the quality of the article were good, but it were not got up to suit the eye, it would not command a sale against factory-made produce, and it would pay better to send the pigs alive to the Adelaide market.

PLOUGH WHEELS.—The Hon. Secretary showed a plough wheel which had been badly worn, and which he had boxed with steel, and he read the following paper :—

Wheels should be carefully protected so that sand and dust does not work in at the back or near the pin, and always kept well oiled or greased. If left till they run dry they will wear rough, and it takes some time to get a smooth surface again. When the wheels and axles get worn to some extent, it is a good plan to roll long horsehair round the axles as much as will go in, and keep well greased and always, when greasing, roll in a little more if there is space. It will get very solid and wears and holds the grease very well, better than on iron, because it will not wear the wheel, but it must always be kept well greased or else the hair will cut to pieces. Wheels badly worn can also be boxed with steel. Make a box of mild plate steel to fit as firm as possible, drive it in tight, then melt some white metal and run it in at the back of the box, this will hold it firm, and the wheel is in good order again.

Gawler River, June 23.

Present—Messrs. T. P. Parker (Chairman), F. Roediger, J. Hillier, J. Badman, A. Bray, J. Barritt, H. Roediger (Hon. Sec.), and one visitor.

OFFICERS.—The following were elected—Chairman, Mr. A. M. Dawkins ; Vice-chairman, Mr. J. Badman ; Hon. Secretary, Mr. H. Roediger.

LUCERN.—In answer to questions it was stated that 4lbs. of seed is required to sow an acre if drilled, and 10lbs. if sown broadcast. A small area well manured and irrigated will give a better return than a larger one not so treated.

MANGOLDS.—Members are agreed as to the great value of mangolds for pigs. Mr. Badman said if the roots are stored for a time they improve in food value.

Mr. Parker had grown up to 20 tons per acre on sandhills lightly manured. The Hon. Secretary said they are excellent for cows if chopped up and mixed with a little bran. Pie melcns are also good for cows.

ROTATION OF CROPS.—As a variation after wheat, members consider peas or oats could be grown in many localities.

CABBAGE CATERPILLARS.—Much damage is done amongst plants of the cabbage family by small green caterpillars, which are difficult to get at as they harbor beneath the leaves [Four ounces of tar mixed with 25 galls. of water will make a spray compound which will prevent any damage by caterpillars. The tar should be poured almost drop by drop into a cauldron of 5galls. of boiling water, violently stirring all the time. If a $\frac{1}{2}$ lb. of soda is dissolved first in the water, the tar will dissolve more easily. Use warm, and with a turned-up spray nozzle.—GEN. SEC.]

Kanmantoo, June 21.

Present—Messrs. John Downing (Chairman), W. G. Mills, J. T. Hair, John Mullins, T. Hawthorne, and A. D. Hair (Hon. Sec.).

PIG-FEEDING.—Mr. Mills read the following paper :—

During the last two or three years pigs have without doubt been the most profitable animals upon the farm in South Australia, and especially so in these southern districts, owing to the numerous bacon factories which have sprung up in our neighborhood. So greatly has the pig industry expanded that at a single fortnight's sale the returns from the pig branch of the market often amounts to hundreds of pounds, and there seems to be no reason why this business should collapse; but it will be wise for those who raise pigs to study how to feed them at the lowest possible cost, and to breed the best sorts. In fact, the breed of our pigs has wonderfully improved of late years, but still there is room for improvement. Two or three points are worthy of study by the breeder or feeder. First, is a quiet but vigorous disposition—that is a good feeder and contented disposition, one that will fight for his food but not be everlastingly squealing for more; second, a well-shaped short-legged pig, not a steeple-chaser, or it will be a job to keep it in the sty; perhaps, also (though it is a minor point), not too much hair, and also a small head set close to the shoulder. As to feeding, this is the most important item of all, and I am not capable of giving any advice, except to feed well, but yet not too well. The most successful pig feeder will be found in the man who gives his pigs a good comfortable yard or sty, kept as dry as possible, and who feeds them three times a day with plenty, but not too much, as it will be found that a pig once surfeited (and they are very likely to do this if fed indiscriminately) will go back for days before they recover. As to what is the most profitable food is a question which everyone must find out for himself, and will largely depend upon the business ability of the feeder and the state of his purse. Many farmers are feeding with wheat, and it will doubtless be found that some of our surplus wheat will go away in pork. No doubt pigs fatten very rapidly upon it, especially when crushed, but I think if one were going into pigs as a permanent thing, and wheat was likely to keep at the present prices, the best plan would be to have it cut with the binder and carefully stacked and fed to the pigs straw and all, as they would eat a good lot of the straw and chaff with it, which would cause it to digest better, besides going further, and be less likely to kill them, which it will do if not very carefully fed raw. There is no cheaper food for pigs than skim milk, as it is such a splendid thing to mix with other food, and it is also worthy of thought whether it is not worth while fencing in with a pig-proof fence a few acres in some moist gully to be highly manured and sown with early and late green feed to be fed off with pigs; or grow a crop of green feed, and then peas, to be fed on the ground any way. With our splendid climate for such things and cheap grains we ought to see this business expand until we export pork to all the world, and be able to raise it as cheaply as anywhere in the world.

Mr. Downing said he had proved it to be possible to over-feed a pig. Regularity in feeding should be strictly observed when fattening any animal in the stall, giving all that it will eat of a given quality at first, and gradually increasing in quality of food until the desired standard is reached. Generally the appetite is not so voracious after a few weeks' feeding as at first, and consequently they should be fed oftener with smaller quantities. Pollard is by far the best of any for fattening purposes. When whole grain was fed to pigs he found they grew more quickly. Mr. Mullins thought it would not pay to

buy grain for feeding pigs. Mr. Mills thought another advantage in binding a ripe crop of grain and feeding in the straw to the pigs would be found in the manure. Messrs. Hawthorne and Mills were agreed in the opinion that the best all-round pigs is a cross between a Berkshire and an Essex. Members consider that pigs should not be interbred too long, as this weakens the constitution very quickly.

Port Elliot, June 24.

Present—Messrs. P. O. Hutchinson (Chairman), J. Nosworthy, J. Brown, H. Green, J. Davidson, J. McLeod, and F. Hill (Hon. Sec.).

TUBERCULOSIS, &c.—Mr. McLeod concluded his paper on this subject, and the members expressed the opinion that the disease exists in the district, and that a thorough inspection of all dairy herds is needful in order to stamp it out. Mr. McLeod's paper stated that various diseases of dairy cattle had been prevalent for some years, chiefly along the range of hills from Currency Creek to south of Hindmarsh Valley, sometimes carrying off the affected beast within twenty-four hours, and in other cases the animal lingered two years and then died. Since December, 1896, when his herd of cows was first affected, he had lost fourteen head, and he had another isolated, apparently suffering from tuberculosis. Two diseases seemed to be present in his herd, viz., paralysis and tuberculosis. The first case of paralysis occurred on December 19, 1896, when a fat cow in full milk was attacked. She was quite well and was milked in the morning, but at 4 o'clock p.m. she could scarcely walk, her back arched, the stomach drawn up, eyes wild and glassy, tongue protruding about 3 in., clear slimy saliva escaping in great quantity from nostrils and mouth, breath strong and very hard. Very severe pain was suffered, the tongue extending more and more, and all power to draw it back seemed to be lost, and the cow died within twenty-four hours. All the internal organs seemed to be healthy, except that a number of small black spots, about the size of large shot, existed all over the small intestines. There were no signs of impaction. Two other cows and a heifer died with the same symptoms within forty-eight hours after attack, and nearly all his neighbors lost two or three cows each at the same time and in the same way. Mr. McLeod then gave lengthy details concerning several of his cows which had been proved to be affected with tubercular disease. At the conclusion of his paper he was unanimously thanked.

Watervale, June 19.

Present—Messrs. C. A. Sobels (Chairman), H. Beck, S. Solly, G. Hunter, W. Smith, L. Buring, H. Croft, E. Treloar (Hon. Sec.), and one visitor.

TAGOSASTE.—Mr. L. Buring said the seeds of true tagosaste (*Cytisus palmensis*) sent out by Central Bureau had grown splendidly with him, and some of the plants were quite 4 ft. high. [These seeds were presented to the Bureau by Mr. M. Holtze, Director of Botanic Garden.—GEN. SEC.]

APPLES AND APPLE TREES.—Mr. Smith had noticed a kind of "scale" insect on his apple trees, which on being pressed gave out a reddish liquid. [Why did you omit to send down specimens for identification, if you do not know what it is or how to treat it.—GEN. SEC.] Mr. S. Solly and other members said their apples were not keeping well this season. Mr. Beck said he had noticed small brown spots beneath the skin of Cleopatra apples. These gradually developed when the fruit was stored, until the fruit decayed. [This is probably "bitter pit," for which no remedy is at present known.—GEN. SEC.]

Arden Vale, June 19.

Present—Messrs. A. Hanneman (Chairman), M. Eckert, M. Searle, C. Pearce, F. Schuttloffel, L. E. Warren, A. W. Fricker, P. Starr, D. D. Liebich, G. H. Williss, G. Millar, E. H. Warren (Hon. Sec.), and four visitors.

FARMERS' PERMANENT RELIEF FUND—Members are not favorable to the establishment of such a fund, but would always do the best in their power to help in cases of extreme need.

LIME-BURNING.—Mr. Eckert described his method of burning lime. His kiln is 7ft. deep, 8ft. diameter, flue on the prevalent wind side. It is important to put a layer of kindling at the bottom, about 6in. high; on that a layer of stumps or heavy wood, packing the spaces with small wood; next a layer of limestone, broken to the size of road metal—say 4in. On this place another layer of wood and small stuff, and so on to the top, three layers in all. Solid stone gives the best lime. Mr. Williss thought a round kiln is best for stumps, and dry wood is better than green, because this makes too much steam. The stone should be broken and sifted before loading the kiln; for cut wood a square kiln is best. Mr. Miller used about two good loads of wood to burn five yards of stone.

BLACK RUST.—Mr. C. Pearce read a paper upon his experiences with black rust (*Urocystus oculata*), as follows:—

My losses from black rust have been very considerable, estimated to be at least £250 within the past eight years. During this period there have been almost total failures for four seasons, on account of the severe drought. It can be readily seen that this loss occurred during a period of four years. Eight years ago, this coming harvest, my first great loss occurred from this cause, which I estimated at fully £130 for that season. At ploughing-time, previous to that harvest, I commenced ploughing in the middle of January, the soil being in a very dry state, and continued until the end of February, when we had half an inch of rain. At this time I had just finished ploughing the half of a 100-acre paddock, which is divided into two parts by a rough reefy hill; the other part of paddock was ploughed after this fall of rain. I could not detect any difference in this crop during the winter months, the whole of it looking remarkably well until late in the spring. When it was coming out in ear, I noticed the part that was ploughed dry was thinning out considerably with black rust, and, after being harvested and cleaned up, the one portion averaged 13bush. and the other 8bush., thus showing a gain of 5bush. per acre on the portion ploughed after such a light fall of rain. I will now, as briefly as possible, give you my experience for the last harvest. Notwithstanding the very low price of wheat, I estimate my loss at fully £70 from black rust. The whole of the crop was put in dry, except 50 acres put in after an inch of rain had fallen in the middle of May. Last year 20 acres of this was ploughed before the rain, and sowed and harrowed after the rain, and the other portion was scarified after the rain. The whole of these 50 acres was almost free from rust. Another portion of my crop, containing 30 acres, which was put in dry—20 acres in a very lumpy condition—which I harrowed after the rain to break the clods. On these 20 acres I could hardly notice any rust, but on the 10 acres not harrowed there was a loss of fully 4bush. per acre from rust. Another paddock of 200 acres was all scarified in with the same quantity of seed sown all over. One piece of 80 acres on the south end was almost free from rust, and averaged 10bush. per acre; the other 120 acres were badly affected, and averaged only 4½bush. per acre. The only reason I have to account for this is simply that the first-mentioned 80 acres were well fallowed just previous to the drought; the other portion had not been fallowed since first being broken up. To conclude, I would advise all farmers to fallow the land as often as possible, and, if compelled to sow and cultivate the land before rain at seeding time, if the same land is only harrowed once after rain, it will be a great preventive of black rust.

TREE-PLANTING.—Mr. A. Hanneman read a paper as follows:—

A number of valuable articles on trees and their influence on the rainfall and climate of a country have lately appeared in the weekly and other papers, to which I would like to call the special attention of our members. They show unmistakably that if trees as well as hills do not attract the rain, they do assist to force the clouds to drop their moisture by keeping the atmosphere cooler and preventing the hot air rising from the hot and baked ground. I therefore wish once more to earnestly request our members and others to help in the noble work of tree-planting. I know well that we are a little down-hearted on account of so many failures, but I feel sure we will have better results if we will do three things which are absolutely necessary to ensure success in tree-planting, viz.:—To protect the young trees by a substantial

fence for at least five years, to water them several times during the first summer, and always have an open furrow or drain on the upper side of the trees to retain as much of the rainwater as possible for them.

"BLOAT," OR TYMPANITIS.—Mr. L. E. Warren directed especial attention to the successful use of carbonate of soda as a remedy when horses have eaten too much wheat. The dose is one tablespoonful of carbonate of soda in a pint and a half of water. [The same remedy is successful for cattle that have become "blown" through eating clover, or any other food which causes the production of large quantities of gas in the stomach.—GEN. SEC.]

Crystal Brook, June 24.

Present—Messrs. George Davidson (Chairman), W. J. Venning, R. Pavy, A. Hamlyn, W. Natt, W. Morrish, J. Chambers, E. Dabinett, George Scott, and George Miell (Hon. Sec.).

FIELD TRIAL.—Decided to convene a meeting of delegates of the North-Western Bureaus Field Trials Society with a view to arranging for a field trial of harvesting machinery, and to elect officers.

TREATMENT OF HORSES WITH COUGH.—Mr. W. J. Venning read a paper on this subject. [Not sent on.—GEN. SEC.]

Millicent, June 21.

COMBINED BRANCH AND "GRANGE" MEETING.—This was held in the Institute, where Messrs. G. S. Thomson (Dairy Instructor) and George Quinn (Fruit Inspector and Horticultural Instructor) were present, together with a large number of members and visitors. A display of products of the district, all of great merit, was staged, and included vegetables, Mammoth Whale squashes, mangolds up to 40lbs. each, kohlrabi, fodder crops, parsnips of monstrous size, potatoes, onions, collections of fruit, excellent bacon, preserved fruits, cooked foods, &c. Vocal and instrumental music enlivened the proceedings.

BUTTER MAKING.—Mr. Rowland Campbell requested the attention of the audience for the purpose of listening to an address by Mr. G. S. Thomson, who spoke to the following effect:—

He was much impressed by the excellent quality of the exhibits of produce staged in the hall, which gave him the idea that the district was a very fertile one. The members exhibited no butter, except in the raw material form of mangolds, but these latter could not be surpassed in South Australia. A large proportion of the audience was made up of ladies, and as he could not speak of catt'e breeds or grasses to them, he would confine his address to the subject of Butter and Butter-making. Going back to the beginning, the points to be observed were cleanliness in respect to both animal and milker. To every atom of dirt clung myriads of bacteria and these invisible bacteria, when introduced into the milk, consumed part of the milk and gave off an acid which turned the milk sour. With cleanliness milk would keep much longer. Having the milk, they probably intended to make butter. If they had a separator, the milk should be put into the separator at the same temperature as it came from the cow, because that gave easier separation. With the pans, the best way was to put the milk straight from the cow into the pans, and as the temperature fell the cream rose. They had thus got as far as the cream. Separator cream was in a sweet condition and they had to let it turn sour if they wished to save the butterfat, as well as to give the butter flavor and keeping qualities. This souring was effected by the same good old bacteria which consumed the sugar of cream and turned it into acid. Acidity must be of a certain degree to get the best results, but as most butter-makers in the country knew nothing of science they had to go to the practical test—of the finger and the taste—and he left the ladies to be the best judges of taste. Having the cream soured they scalded the churn, rinsed it with cold water, put in the cream, and started churning. They must ventilate the churn during churning so that the gases evolved should not get back to the butter. After a quarter of an hour's

churning the butter fat should be formed into granules. They should pour in cold water, say 1 gal. to 1 gal. of cream. This hardened the butter fat. The churn should then be revolved two or three times, the water drawn off, and more put in. This should be continued till there was no trace of butter-milk in the water. Butter-milk in the butter meant deterioration. White specks in butter were due to skim milk descending to the cream and being distributed through the butter. To the men he said that they were trying to compete with such a country as Denmark, and they must combine scientific with practical work. They must eradicate tuberculosis from their herds, as at present there was a sort of panic over tuberculous butter in Britain. To build up an industry they must begin at the foundation, and the health of the herd was the foundation of the dairying industry. It was not to the farmer's loss to have tuberculous cattle destroyed, for the cattle were ill and must die, while if left they only infected others. In Denmark, after all the care taken with the herd, the factories went further, and 94 per cent. of them pasteurised their milk by raising it to 185 degrees of heat and destroying the germs. The men must pay attention to the pastures, and in this connection he had a parcel of seeds with him to distribute. In reply to Mr. W. Campbell, the speaker said that earthenware pans were the most durable and had the least hurtful effect on the milk.

Mr. R. Campbell called attention to separators, and said that he had recommended a neighbor to get a separator, and, after buying a £23 machine, the neighbor had just about paid for it in a year. His butter output had risen from 60lbs. and 70lbs. to 90lbs. and 100lbs. a week.

FRUIT-GROWING. Mr. Quinn, fruit-growing expert, said that when not confined to a special subject, he generally tried to look around a district and to deal with local matters. He had not seen much of this district, but had seen enough to know that they did not go into fruit-growing with a commercial end in view. He did not see, however, why they should not grow enough for their own use. From his acquaintance with the district it appeared to him that they had a soil that was generally rich in vegetable matter, inclined to be sour and requiring draining and working, both in early winter and summer. The climate appeared somewhat bleak and rough; still in selected spots they could grow most Penola fruits. The first thing needed in most localities would be a good wind-break, which ought to be growing for a couple of years. Whatever was used for this wind-break, the roots could be cut off from the garden by a trench, or he had seen sheets of galvanized iron sunk vertically in the ground to stop the spread of roots. In the preparation of soil early settlers generally followed the practice in Great Britain and turned up the lower soil. Here the sub-soil was a hungry one, consequently trees usually went back after growing well for a couple of years. He did not recommend the planting of fruit trees in the deep rich flats of the districts where they would go to wood, but to choose a slope. If there was a rocky bottom they might break it up by putting a few plugs of dynamite in the holes. If it were a clay sub-soil it needed under draining. With their 30in. of rainfall the soil became saturated for four months of the year. By under draining the surplus water would be removed and the ground made warmer. In the small area that would be planted they need hardly have two trees of the same variety, since they were not bound down like the exporter. People going to a nursery generally wanted as much tree as they could get for their money. This was a mistake, as small well-grown trees would do best. Trees should be got early in the season, while there was still warmth in the ground so that the roots got a good start, and when summer came the tree was prepared to go ahead. On the question of the depth of planting, he did not see that it made much difference to have the trees an inch higher or lower than the nursery had them.

Strathalbyn, June 19.

Present—Messrs. M. Rankine (Chairman), D. Gooch, W. M. Rankine, R. Watt, H. Butler, and J. Cheriton (Hon. Sec.).

OFFICERS.—The office-bearers were thanked and re-elected.

ANNUAL REPORT.—The Hon. Secretary read the annual report, which showed that ten meetings had been held during the past year, with average attendance of eight. Three papers were read, and a visit had been paid to the farm of Mr. E. R. Morgan, Watulunga. The Annual Conference of Southern Branches was held at Strathalbyn, on March 14, when nine Branches were represented out of nineteen, and not as many members as there should have been. Members of the Strathalbyn Branch ought to show a better attendance at the monthly meetings, and should bring friends as visitors. They all get a free copy of the *Journal of Agriculture and Industry*, and could hardly fail to appreciate the varied information contained therein.

Golden Grove, June 22.

Present—Messrs. T. G. McPharlin (Chairman), J. R. Smart, A. Robertson, John Ross, F. Buder, R. Smith, H. Bowey, and A. Harper (Hon. Sec.).

BUSINESS.—A ballot was taken to decide turns for preparing papers or initiating discussions at Branch meetings, and the matter decided for thirteen months. [This practice of each member taking it in turn to be responsible for the main subject to be discussed should be more generally adopted, and when the matter is settled members should regard it as a matter of honor to fulfil their undertaking. The subjects will of course be left to the individual members to select, but they should be practical and seasonable.—GEN. SEC.]

MANURES FOR PEAS.—A question was asked as to best manures for peas, and considerable discussion ensued. Bonedust was considered to be best, and it was generally conceded that the pea crop greatly benefited the land, though it is rather a precarious crop, and the trouble of harvesting, especially during a busy season is against it. Mr. Smith thought it possible to harvest a good crop of peas with a binder with some arrangement fixed to cut the side of the swathe also.

Wandearah, June 15.

INAUGURAL MEETING.

Present—Messrs. G. Robertson, J. Kurl, G. Collins, N. J. Fuller, W. Mun-day, L. Stanley, E. H. Fagle, R. J. Dennis, T. Joyce, and O. E. Birks.

BUSINESS.—Messrs. G. Robertson and C. E. Birks were elected Chairman and Hon. Secretary respectively. Matters connected with the working of the Branch, rules, &c., were considered. Papers upon tree-planting, fallowing, and rolling were promised.

Mount Remarkable, June 22.

Present—Messrs. A. Mitchell (Chairman), W. Lange, C. E. Jorgensen, T. P. Yates, H. B. Ewens, J. B. Murrell, J. H. Girdham, and Thomas Casley (Hon. Sec.).

POULTRY AND EGGS.—A lengthy discussion was initiated by Mr. Ewens. Members were divided as to whether fowls thrive so well in houses as in natural shelter, such as trees and shrubs. It was agreed that when hatched at the proper season, well cared for, and kept without roosters, hens will produce the best kind of eggs for export or for keeping.

Elbow Hill, June 27.

Present—Messrs. H. T. Styles (Chairman), C. G. Ward, W. C. Ward, W. N. Bencke, J. Ellaway, James Foulds, E. Wake, G. C. Dunn, J. Harvey, F. J. Brooks, and two visitors.

PEOPLES' BANKS.—The Chairman reported having written to Mr. F. H. Snow, of Adelaide, re establishment of local funds from which subscribers could obtain loans in case of distress at low interest. Mr. Snow had advised that he was preparing a paper on this subject for publication in the *Journal of Agriculture and Industry*. The Chairman read extract from article by Mr. Snow in the November, 1898, issue of the *Journal*, and Messrs. Styles and Wake reported they were making inquiries in the same direction, and hoped soon that they would be able to lay some definite scheme before the Branch.

A PAYING INCOME.—Mr. Wake stated that he had been wrongly reported in the discussion on paper by Mr. Brookes on this subject, published in the June issue of the *Journal of Agriculture and Industry*. He did not mean that he considered Mr. Brookes' estimate of 14s. 7½d. per acre as cost of production of wheat in this district was too high, but that the returns on which the estimates were based were too high. He did not believe during the past four years that the returns had averaged 10s. per acre, and he considered they required at least 20s. per acre to make the business profitable.

TREE-PLANTING.—Mr. Wake initiated a discussion on this subject. He believed if the farmers generally went in for planting gums in a systematic manner their work would eventually prove of great benefit to the colony generally. In reply to question as to best variety to plant in this district members generally favored the redgum. Mr. Ellaway referred to the great value of the Carob tree. Mr. Styles thought the African box thorn worth planting for fences, but wished to know if there was any danger of its spreading and becoming a nuisance. Members thought it was likely to spread and become a harbor for rabbits. [Will members please give their experiences on this point. The plant being very hardy, free seeding, and the fruits eaten by birds, we would naturally expect that there would be considerable danger of its spreading, but so far no complaints have been made, and our observations have failed to note any case where it has done so.—GEN. SEC.].

WHEAT CHAFF.—Mr. Styles asked for information as to best means of preserving wheat chaff.

TANK-BUILDING.—Mr. Dunn inquired *re* best tank to put down in limestone country. Mr. Ellaway thought shape of tank and ground mattered little; good mortar and good masonwork were the chief necessities. Mr. Wake had good results from tank built well and backed up with clay; he preferred a round tank, or one with straight walls and rounded corners. Mr. Beincke had all square tanks, which held well. Mr. Ellaway said straight walls were preferable on account of cheapness in excavating.

Nantawarra, June 19.

Present—Messrs. J. W. Dall (Chairman), S. Sleep, A. F. Herbert, R. Nicholls, R. Uppill, A. L. Greenshields, E. J. Pridham, J. Dixon (Hon. Sec.), and two visitors.

OFFICERS.—Mr. E. J. Herbert was elected Chairman, Mr. Pridham, Vice-chairman, and Mr. J. Dixon, jun., Hon. Sec. Past officers were thanked.

BAG-WORM.—Mr. G. Belling tabled a considerable number of large cocoons of bag-worms, eight-ribbed and very tough. They are about 1in. long, and contain a considerable quantity of silk, not only in the outer bag, but also enveloping the caterpillar, which never leaves her home, but carries it about until maturity, whilst feeding (generally at night) and finally fixes it in a pendulous position to a twig. These "worms" are indigenous, and live principally upon leaves of eucalypts, but occasionally attack fruit trees and other plants. In this case they were found in numbers on sugargums (*Eucalyptus corynocalyx*). When they are numerous, the remedy is to spray the trees with Paris green in lime water in which some sugar or other sticky substance has been dissolved; 1oz. Paris green is sufficient for 8galls. of water.

THIN SOWING.—Mr. Dall thought many farmers in the district were drilling in too much seed; some were putting in 40lbs. wheat per acre, but better results would be obtained with less seed. He had often got good results from 30lbs. and less per acre. Mr. Nicholls said thicker sowing kept down wild oats and rubbish, and the crop was not nearly so liable to go down. Mr. Pridham said that on one part of his field the man had set the drill wrongly, and was

sowing too thinly, so he cross-drilled a portion of it, and this gave him 3bush. per acre more than he got from similar land that was drilled in the ordinary way. He considered about 35lbs. per acre the right quantity for this district. Members decided to experiment with small plots, and give the results after harvest.

EXPERIMENTS.—Tagosaste seeds gave only one plant with the Hon. Secretary, but Mr. Nicholls had several plants come up after being sown a long time. Red and White Kaffir corn did fairly well last season.

Woodside, June 19.

Present—Messrs. R. Caldwell, M.P. (Chairman), A. T. Hughes, J. H. Snell, J. Cuthbertson, R. W. Kleinschmidt, J. C. Pfeiffer, C. W. Fowler, R. P. Keddie, G. F. Lauterbach (Hon. Sec.), and one visitor.

FARMERS' PERMANENT RELIEF FUND.—Mr. Caldwell stated that his paper on "The Impropriety of Establishing a Permanent Farmers' Relief Fund" had been well received at the Conference of Southern Branches held at Strathalbyn on March 14, and a resolution approving of the principles enunciated in the paper was carried.

STANDARD WEIGHT OF CHAFF.—It was resolved to request the General Secretary to again bring the resolution carried at a previous meeting, regarding standard weight of "bag" of chaff, under notice of Parliament. [The General Secretary cannot do this. The proper persons to bring question before Parliament are Ministers of the Crown and members of Parliament.—GEN. SEC.]

EXPERIMENTS.—Mr. Snell invited members to visit his homestead, where he has a number of plots of land sown with various seeds and treated with different sorts of manures.

Pine Forest, June 20.

Present—Messrs. W. H. Jettner (Chairman), J. Phillis, J. Flowers, J. St. J. Mudge, F. Masters, F. Inglis, W. Burgess, and R. Barr (Hon. Sec.).

FOREST-TREE PLANTING.—Chairman read the paper written by Mr. Thomas Hair for Kanmantoo Branch meeting on April 27. He considered it a valuable paper, and thought members could not do better than follow the precepts therein enunciated. Other members considered that the difference in soil and climate here would alter the conditions. Deep ploughing for trees would be injurious in this locality—[Question?—GEN. SEC.]—and tree growing would not enhance the feeding capabilities of the land, as the ground must be cultivated and kept free of weeds to allow trees of any sort to start, and afterwards grass must give way to trees or trees to grass. Want of moisture in the soil is against growing both crops at same time. Mr. Phillis strongly advised all parties to raise their own trees. He had never been successful in growing gums raised in bamboos, but had planted thousands, grown in pots, with good results. Instances had been given of £200 per acre being secured from forests of twenty years old in suitable localities. After a long discussion it was resolved:—"That this Branch is in favor of forest tree cultivation, either by planting the sugargums (the only tree likely to give satisfaction to the planter in this neighborhood) or saving belts of indigenous timber, pines, or mallee."

SHELTER FOR STOCK.—Mr. F. Masters read the following paper:—

The progressive farmer is ever on the alert to learn—he is not content with things as they are if he thinks he can better them. He cares not from where the ideas come so long as he can press them into his service and advance thereby the profits of his farm, the betterment

of his living, and the wellbeing of his stock. A point in the management of his farm which the intelligent farmer cannot afford to overlook is the sheltering of his stock. It would be a mild climate indeed where shelter for stock was not required, and yet, were an observer to judge the climate by the shelter provided for stock on many farms, he would be led far astray. It has often struck me as a most curious policy, in a district like ours where our land originally was covered with trees, to entirely denude the farm of natural shelter. Surely a clump in each paddock might have been saved for this purpose. Now, through the liberty given to that ruthless destroyer—the axe—when first settlement took place here, it will cost us much time, labor, and pains to provide shelter for stock in the shape of trees. All must agree that some shelter is necessary, as well from sun and rain as from heat and cold. An animal shivering in the cold is not a payable one, because the food consumed has to go to keep the cold out instead of putting it in condition, while in summer it is nothing but cruelty to dumb animals to leave them exposed to the sun's rays. If the timber on our farms has all been destroyed then we must plant suitable trees for shade and shelter from cold winds. For the former we must have trees of some height and with good overhead foliage, while for the latter we need to plant those of bushy habit; and, with stock continually in the paddock and browsing from time to time on the low and bushy trees, it is a very hard job to keep a small patch of timber suitable for protection against wind, and, although for shade a plantation or natural clump of trees cannot be beaten, yet they often afford but poor protection against cold winds. To provide a shelter from wind and at the same time provide food for his stock, the farmer can resort to a strawstack—a rarity in our district, truly, but one which each ought to have to protect his stock. For the labor and time involved he would be amply repaid, besides, in a time of drought it would indeed be a boon. The stock seem to take a delight in pulling at the stack and eating even in times of plenty, and especially is this so on cold winter nights, thereby showing their appreciation of the thought and care of their owner. Before we could raise much shelter in the way of trees several years must elapse, and the strawstack might well be used until the trees attain sufficient size to give shade. Some people grumble at the time and labor and expense entailed in raising plantations of suitable trees, but such people have little foresight, as not only will shelter be obtained but also timber, which will be scarce in a few years. Fortunately for myself I have not the need to plant, as plantations of young pines had sprung up when I bought the farm, it not having been cropped for three or four years previously, and the ploughing had buried the pine cones, which had rotted in due course and the seed had germinated. These plantations I am careful to protect. I have noticed the same thing on several farms in the district, and on some I am glad to see them being preserved. I have only referred to the sheltering of stock in the fields so far, but working stock and pigs perhaps require more sheltering than that in the fields. Care then should be taken to provide horses in work with warm cosy stables, free from draughts in winter and yet large and airy enough to be cool in summer. Pigs, I believe, are more neglected, as far as shelter goes, than any other farm animal. Anything is good enough for pigs, farmers seem to think, and can accustom themselves to weather of any kind; and so, instead of providing a nice roof for their pigsties, and plenty of straw for bedding to keep themselves clean and warm, let the straw rot in the paddocks and their pigs shiver and squeal in the rain and slush. Then they tell us pigs do not pay to keep; and no wonder under such treatment. Beside the humane side of the question there is the practical or profit side too, the latter of which will be found by following in the trail of the former and providing shelter of the best available kind for our stock.

Members decided to apply for and plant 1,300 sugargums and 600 vines.



INDUSTRY.

SUPPLIED BY THE DEPARTMENT OF INDUSTRY

(C. C. CORNISH, SECRETARY).

Labor Disputes.

Labor disputes may be classed among the unavoidable costs of industrial greatness; the one is but a corollary of the other, and there is little chance of complete immunity from such troubles, however much it may be desired. We are not without indications, however, that the extreme step of stopping work is not so hastily taken, but is adopted rather as a last resort, and in most cases only on a great issue. The Government return, issued this week, certainly suggests the existence of a greater effort towards amicable arrangement in small matters. Thus, although the number of days lost, directly or indirectly, in strikes last year totalled 10,345,523, more than half this time was due to the settling of a question of some economic importance. The engineering dispute, up to the end of the year, cost 47,500 working men 5,731,000 days' pay, and if to this be added the days lost at the beginning of this year we have a total of 6,849,000 days, which at the low computation of 4s. wages per day means £1,369,800 in wages alone. Presumably the men or their leaders considered that the demand they made was worth such self-denial as is indicated by this amount, while the employers lost much in resisting. The credit side of the ledger has the settlement of an issue of some importance. There is no need to discuss this settlement; but if its value is to be measured by its cost to both suing parties, then it ought to be of permanent benefit. Let us hope that it will be.

For some years a great strike has raised the loss above the normal: In 1893 the miners lost 26,000,000 days' work against 5,165,062 days by all other trades; the Scotch miners swelled the total in 1894; boot and shoe operatives in 1895; while this year the South Wales miners provide the "dispute of magnitude." The issue was not in all these instances of importance from the point of view of national economics—although the duration of the strike affords some estimate of the view taken by the interested parties—and it usually happens, whether from an exhaustion of the resources available, or because the result is reached through the limit of endurance, that peace is insured for a period, so that there is national advantage ultimately. The "dispute of magnitude" is, of course, a direct result of the federation of labor, and since it has led to a corresponding organisation of employers there is at least a prospect of the issue being clearly stated, and the result being widely, if not permanently, accepted. There is also a presumption in favor of peaceful solutions being sought after more diligently in most cases. Great military and naval powers are less prone to put into action their well-equipped machinery of warfare than the small powers, with deficient resources and little to lose. It is true the progress of civilisation is operative in such international affairs, but the analogous quality of mental discipline is developed by industrial combination, and there is less tendency to take a narrow view or hasty action. Indeed, in disputes under such auspices one can recognise that the special cause of disagreement is not so much the wages question—which was the issue in ninety-nine out of every hundred disputes of ten years ago—but rather some claim by the men which can be traced as often as not to that tendency towards communism or socialism now so dominant. It is really the case of the little learning operating dangerously. The men are willing to contest such cases as have associated

with them idealic sentiment irrespective of impossibilities arising from international competition, and the hope of the future lies in a wider knowledge of economic conditions.

Excluding the engineering dispute, there were 4 614,523 days' work lost in strikes by 182,767 workers. but including that long contest between capital and engineering labor the loss was 10,345,523 days. This figure may be more fully realised if we state that it is equal to the average life work as journeymen of 1,150 men. This work has been irrecoverably lost to the nation. It is not enough to show that our imports and exports have grown, notwithstanding the cessation of labor, for time, even for work, cannot be recalled. The year's loss in labor is the greatest since 1893. when the miners were involved in their disastrous wages dispute. In 1894 it totalled 9,322,096 days, in 1895 5,542,652, and in 1896 3,748,525 days; so that the total for the past year exceeded that for the two preceding years combined. The number of people involved, however, has been less than in most preceding years, so that each worker experienced last year on an average a much longer period of idleness. That, however, is due to the engineering dispute, for it is remarkable how uniform the number of workers and hours lost has been for some years if all "disputes of magnitude" are excluded from the calculation. On an average about 210,000 workers are involved, and they lose 4,000,000 days' labor. Last year the figures were 182,767 workers and 4,614,523 hours. These figures do not seem so great when one remembers the large size of the industrial army. They constitute a comparatively small ratio to the total number of workers. Even the 10,000,000 days' labor lost, including the engineers' dispute, does not then appear so vast, for if we assume that a sixth of the population are wage-earners, we find that in England 176,854 people were involved in strikes out of 5,000,000 wage-earners, or about $3\frac{1}{2}$ per cent.; in Scotland, 35,722 out of 700,000 wage-earners, or 5 per cent., the greater ratio than in England being due to the large number of engineers in the north; Ireland had 17,541 workers involved out of 800,000 wage-earners. There are wide variations in the different districts; London and the southern counties have not been much affected, but the engineering districts of Yorkshire and Lancashire as in Scotland, work out at from 5 to 6 per cent.

We have indicated that fewer disputes than heretofore are due merely to wages. The numbers for five years are instructive—567,460; 234,903; 143,198; 115,817; and 106,293, the latter for 1897. The large number in the first year, it is true, was due to the miners; but it is a striking fact that there has been a decrease in the number of wages disputes from 89.2 per cent. of the total in 1893, and 72.4 in 1892, to 58.3 per cent. last year. This, too, is on a rising market, when labor is in increasing demand. Two-thirds of the strikes caused by the wages question were for increases. There is, however, an advance in the number of disputes due to the demand of the men for shorter hours. In 1893 there were only 370 such disputes; in the following year they had grown to 5,884; in 1895 they were again fewer—1,420; and in 1896, 1,610, or less than 2 per cent., of all the disputes; while the inclusion of the great engineering dispute brings last year's number up to 51,192, or 22.9 per cent. of the total disputes. Even if this exceptional case be excluded, however, the number of disputes due to claims for shorter time is still large, numbering 3,692. The other causes do not indicate much fluctuation. The employment of particular classes or persons—including, presumably, demarcation disputes—does not decrease, being 8.5 per cent. of the total, against 3.8 per cent., as in the previous year, and $1\frac{1}{2}$ per cent. in the other years. The number has risen from 3,699 in 1894 to 19,529 in 1897. Working arrangements, which include the tendency in some quarters for the men to take upon themselves the prerogatives of management, were responsible for 16.6 per cent. of the disputes,

about the same as in the previous year; and trades unionism for 3·5 per cent., against 6 per cent.

The results generally may be accepted as in some degree indicative of the measure of the justification for raising or defending demands, and it is remarkable that only 21·6 per cent. of the disputes were settled wholly in favor of the men, while 44·5 per cent. were wholly in favor of the employers; 32·7 per cent. of the cases being compromised, while the remainder, 1·2 per cent., are still unsettled. The following table shows that the men won most of their cases in the matter of wages, and on the principles of trades unionism. This is what one would expect on a rising market, while the employers won most of their cases on the question of the hours of labor, wages, and management. The table gives the number of workpeople engaged in disputes settled respectively in favor of men, of employers, or by compromise, the total under each principal cause of dispute being given in the last column.

Principal Cause.	In Favor of Workers.	In Favor of Employers.	Compromised.	Indefinite or Unsettled.	Total Number Affected.
Wages	28,918	32,480	42,678	2,217	106,293
Hours of labor	3,304	47,877	1,546	43	52,769
Employment of particular classes or persons	2,543	7,372	9,614	—	19,529
Working arrangements ..	6,548	11,499	19,801	463	38,311
Trade unionism	6,584	865	560	9	8,018
Other causes	1,891	2,389	1,067	—	5,347
Total	49,788	102,482	75,265	2,732	230,267

The men had all the advantage in the building trade, and largely in the clothing trade; but in the metal and engineering and shipbuilding industries the men only succeeded in 8·9 per cent. of cases, the remainder being wholly in favor of employers or settled by compromise.

It can scarcely be said that the figures show any progress in the principle of compromise. The percentage was 32·7 per cent. last year, against 26·9 per cent. in 1896; but in 1895 it was as high as 47·1, and in 1894 34·2 per cent. Outside interference seems to have little effect. The great factor in the ultimate settling of disputes was, as in previous years, direct arrangement or negotiation between the parties or their representatives. Of a total of 864 disputes, involving 230,267 workers, 624, in which 187,048 workers were interested, were arranged by direct negotiation, while arbitration, conciliation, or mediation was responsible for settlements in only forty-one cases, involving 19,300 men. Of course, as is pointed out by Mr. J. Burnett, the Chief Labor Commissioner at the Board of Trade, in the report before us, the figures do not represent the full value of the Conciliation Boards at work, since many disagreements are thereby arranged before they develop into strikes, but the figures from first to last seemed to show that strikes belong irremediably to real industrial life, and that in a large proportion of them settlement can only come after a sufficient opportunity has been granted for what is colloquially known as "fighting it out."

Promised Legislation.

The Government have promised to introduce into Parliament a Workmen's Compensation Bill, on the lines of the Bill of last session; a Seamen's Bill, which will provide that a man shall not be enrolled as one of the crew of a ship unless he produces a proper and legal certificate as to his competency as an

A.B., an O.S., or as a fireman; a railway to the Queensland Border, and a graving dock at Port Adelaide, both of which works will, if authorised by Parliament, give employment to hundreds of men; a Consolidated Factories Act, which will reduce the evils of sweating. A Workmen's Liens Consolidation Bill is also promised; whilst the extension of the Mining on Private Property Acts will open thousands of acres of auriferous land to prospectors. The extension of the State Export Department will also give employment to numbers of men in preparing meat, wine, dairy produce, and the despised bunny for transmission to Europe.

A Hive of Industry.—The Glanville Workshops.

The work at this manufactory is now in full swing, the number of men employed being:—Fitters 25, smiths 12, turners 3, shipwright 1, strikers 7, carpenters 4, patternmakers 3, moulders 47, furnacemen 3, tinsmiths 2, machinists 2, boilermakers 22, enginedrivers 2, riveters 3, ganger 1, lineman 1, youths 98, laborers 94, fettlers 7, galvanizer 1. The work these artificers and others are engaged on is the manufacture of cast-iron pipes, 2in. to 18in. diam.; general iron, brass, and foundry work; water meters, all sizes; cocks, all sizes, for water, &c.; bolts of all kinds, also fish and fang bolts, &c.; nuts, all sizes; dogspikes, railway crossings, and switches; wrought iron and steel work; engine boilers; girders; jetty work; dredger repairs, &c.; building a hopper barge, &c., &c.

It would well repay anyone who takes an interest in local industries to pay a visit to the Government workshops, at Glanville. The works are under the charge of Mr. W. F. Slade, Engineer and Superintendent of the Works, under the direction of the Engineer-in-Chief.

Ironstone Flux Trade, Port Augusta West.

The demand for ironstone as flux by the Broken Hill Proprietary Smelting Works at Port Pirie has caused people to turn their attention to the mining of this ore. One result has been to open up an immense deposit of ironstone, known as the "Iron Nob" or "Iron Monarch," a mountain of ironstone situated on the Caroon station, in the Gawler Ranges, about forty-five miles west of Port Augusta, and which has been described as the largest deposit of iron ore in the Southern Hemisphere.

The mineral leases are at present held by the Broken Hill Proprietary Co., who are working them, and sending the ore by teams to Port Augusta West for shipment to the smelting works at Port Pirie.

There are two kinds of iron ore in this large deposit; one is known as "hematite ore" and the other "manganiferous iron ore." Though this deposit of iron has been known to be there for the last thirty years or so, nothing had been done successfully to use the minerals or develop the mines till last year, when the Broken Hill Proprietary Co. sent to their smelting works at Port Pirie a trial parcel of 300 tons, followed this year by contracts being let for carting 400 tons, which is now in full swing. About 500 tons of ore has been delivered since last March, thus giving employment to a large number of teamsters, who previously were occupied in carting station stores and wool for the numerous pastoral lessees who once occupied the West and North-West pastoral country. The number of teams engaged in carting this ironstone at present number twenty-two, being twelve horse teams and ten bullock teams, the number of horses in each team being from ten to twelve, and bullocks about sixteen each, some with eighteen in each team, thus giving employment to

about 120 head of horses and about 160 bullocks, with twenty-two drivers, who are, in most cases, the owner of the team they drive. More teams will be required to get the contracts finished in time.

The number of men employed on the mine is only four, but no mining has been done yet, almost all the stone being sent away being got on the surface. Some of the rocks broken up contain quite 30 tons of iron.

The ore, after being delivered at Port Augusta West, is shipped to Port Pirie by ketches and coasting vessels, which deliver it into drays at the company's wharf, Port Pirie, whence it is carted over the weighbridge and direct to the tip; the contractors for the carting from the mine to Port Augusta West being paid for the quantity of ore delivered over the weighbridge at Port Pirie at the rate of 16s. a ton.

The following vessels are engaged in the trade :—*The Francis*, cutter; *New Arrival*, ketch; *Britannia*, ketch; *Broughton*, ketch; and the *Cadell*, steamer.

Workmen's Compensation Act in England and Wales.

A return has been presented to the Imperial Parliament giving statistics of the proceedings in County Courts in England and Wales under the Workmen's Compensation Act, 1897,* and the Employers' Liability Act, 1880, during 1898.

The total number of arbitrations in County Courts under the Workmen's Compensation Act during the period from July 1, 1898—when this Act came into force—to December 31, 1898, was 178. (It is pointed out that the right to compensation under the Act accrued with regard to accidents happening on and after July 1, 1898, that it was only at an interval after that date that disputed cases would come before the County Court or arbitrators, and usually a further delay would occur before the case could be settled; so that the return, which gives the results of cases dealt with and settled really relates to a much shorter period than six months, and the figures which it contains represent in fact about three months' working of the Act.) Of this total of 178 cases, 104 were heard by the judge and 8 by an arbitrator, while 18 were settled by acceptance of money paid into court and 48 were otherwise disposed of. Out of 130 cases thus heard or settled, there were 101 in which the result was for the plaintiff and 29 in which the result was for the defendant. The 101 cases resulting in favor of the plaintiff secured in 48 cases awards of lump sums amounting in the aggregate to £7,766 1s. 1d., and in 53 cases awards of compensation, taking the form of weekly payments, amounting in the aggregate to £32 18s. per week. Solicitors' costs, amounting in the aggregate to £663 3s. 8d., were awarded in a total of 60 cases.

The memoranda relating to cases settled by agreement or informal arbitration registered in County Courts, under schedule II. (8) of the Compensation Act, numbered 163, 152 of these cases being settled by agreement, 9 (including one memorandum of a decision that the employer was not liable) by a committee representative of employers and workmen, and 2 by an agreed arbitrator. The total amount of compensation given in the form of lump sums in 18 of the cases to which these memoranda related was £2,443 8s. 7d.; and that given in 144 cases, in the form of weekly payments, amounted in the aggregate to £87 6s. 1d. per week. It is observed that, since it is apparently not considered

* It is pointed out that the cases which come before the County Courts do not represent any considerable proportion of the cases in which compensation is claimed or paid under the Act. "There is a concurrence of testimony that in the great majority of cases the full compensation allowed by the Act is given without question."

necessary in most cases to go to the trouble of registering memoranda, the figures stated as to agreements and informal arbitrations represent only a very small fraction of the cases so dealt with. (Nearly three-fourths of all the memoranda registered come from two adjoining districts.)

The total number of the actions in County Courts under the Employers' Liability Act in 1898 was 681 (as against 688 in 1897), of which 220 resulted in judgment for the plaintiff and 126 in judgment for the defendant, while 3 of these cases were removed into the High Court and 332 were otherwise disposed of. In the 220 successful actions just referred to damages to the aggregate amount of £16,853 5s. 2d. were awarded. In 208 cases solicitors' costs to the total amount of £4,724 15s. 1d. were allowed. In 5 of the cases in which judgment was given under the Employers' Liability Act against the plaintiffs, these suitors were awarded compensation amounting altogether to £68 4s. (less in one case £8 13s. 4d. costs) under section 1 (4) of the Compensation Act.

The average amount of damages in case of death awarded in actions under the Employers' Liability Act amounted to £85 6s. 4d., as compared with £200 2s. 7d. in arbitrations in County Courts under the Workmen's Compensation Act. Solicitors' costs under the latter Act in 60 cases averaged £11 1s. 1d. per case, as against £22 14s. 4d. in 208 cases under the former Act.—[*Labor Gazette* (England) for May.]

Early Closing.

The Right Hon. the Premier and Attorney-General has lost no time in redeeming the promise he made last year, and on the opening of Parliament gave notice for the introduction of the measure which passed the House of Assembly last session, but which was rejected in the Legislative Council on the 7th December, 1898. In order to secure the passing of the measure every man and woman for which this legislation is intended to benefit must be up and doing. A long pull, a strong pull, and a pull all together by each and every worker will strengthen the hands of the mover of the Bill and its supporters in Parliament.

On Thursday night, the 22nd ult., the Right Hon. the Premier received a deputation from the Trades and Labor Council, introduced by Mr. Batchelor, M.P., when the matters relating to the factories, early closing, and other questions of interest to the workers were fully discussed.

When the assistants have secured this boon its provisions might well be extended to others who now cheerily have to work for lengthened periods in the interest of the movement.



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